

Online Course

أستــاذ

أحمد حمدي هاشم

ICT TEACHER

خبرة أكثر من 15 عامًا في تدريس مادة التكنولوجيا في المدارس العربي والخاصة للغات والرسمية للغات

يُعلن عن

بدء الحجز
للعام الدراسي الجديد 2024-2025
في مادة تكنولوجيا المعلومات ICT
للصفوف الاتية:

- الرابع - الخامس - السادس الابتدائي.
- الاول الاعدادي.

الحجز عن طريق الواتس على رقم
01004767201

من يوم 14-7 الى يوم 17-7 أو اكتمال العدد

الأبطال لا يولدون، بل يُصنعون!

@SIRAHMED75

reallygreatsite.com



CHALLENGE EVERYTHING

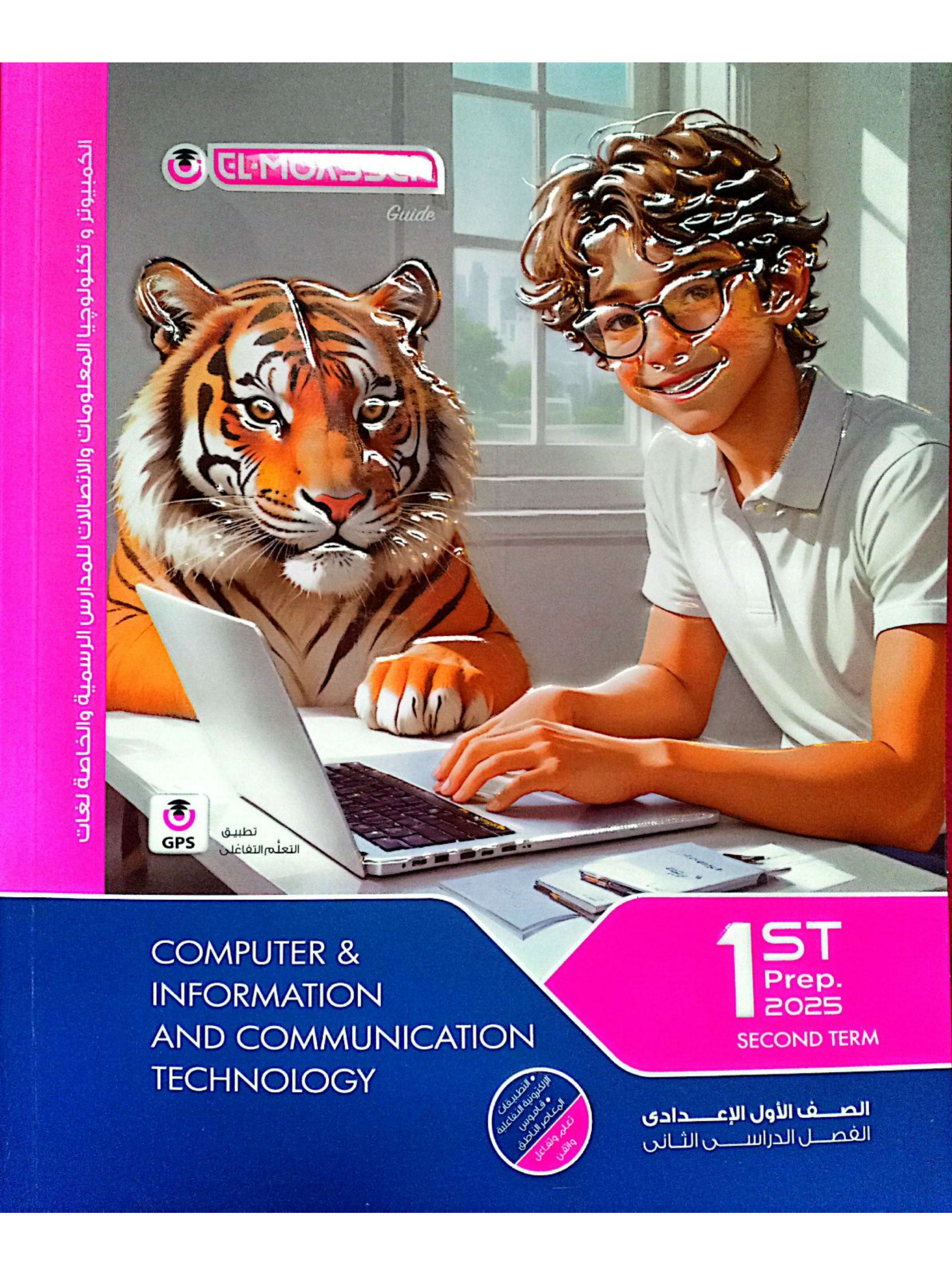
رحلة الطلاب
إلى قمة الترتيب

الأبطال لا يولدون، بل يُصنعون!

احجز مقعدك

كورسات اونلاين لمادة التكنولوجيا ICT

للصفوف الرابع والخامس والسادس الابتدائي والاول الاعدادي
للمدارس العربي واللغات



الكمبيوتر و تكنولوجيا المعلومات والاتصالات للمدارس الرسمية والخاصة لغات
Guide
GPS
تطبيق
التعلم التفاعلى
COMPUTER &
INFORMATION
AND COMMUNICATION
TECHNOLOGY
1ST
Prep.
2025
SECOND TERM
الصف الأول الإعدادى
الفصل الدراسى الثانى



Guide

الكمبيوتر و تكنولوجيا المعلومات والاتصالات



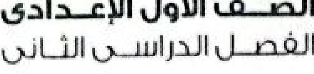
COMPUTER & INFORMATION AND COMMUNICATION TECHNOLOGY





AL TALABA BOOKSTORE
For printing, publication & distribution
El Faggala - Cairo - Egypt
Tel.: 02/ 259 340 12 - 259 377 91
e-mail: info@elmoasserbooks.com
www.elmoasserbooks.com
15014

1ST Prep.
SECOND TERM



الفصــل الدراســى الثــانى

Objectives



Lesson 1

Artificial Intelligence Applications

By the end of the lesson, I will be able to :

1. List types of artificial intelligence
2. Review some practical applications of artificial intelligence
3. Suggest the largest number of ideas for the uses of artificial intelligence in our lives

Lesson 2

Sensors

By the end of the lesson, I will be able to :

1. Mention the different types of sensors and their areas of use
2. List the importance of sensors in our modern life
3. Design a simple project based on the idea of sensors

Lesson 3

Robot

By the end of the lesson, I will be able to :

1. Explain the concept of robot
2. List the types of robots and their functions
3. Suggest the largest number of ideas for the uses of robots in our lives

Lesson 4

Scratch

By the end of the lesson, I will be able to :

1. Explain the uses of the Scratch program
2. Deduce the features of the Scratch program
3. Use the Scratch program to create a simple project

Lesson 5

Sprites Area in Scratch

By the end of the lesson, I will be able to :

1. Discuss the concept of sprites area in Scratch
2. Create a simple project in Scratch and its role in our lives
3. Develop my project (add-delete-modify) for sprites on the project

Lesson 6

Principles of Python

By the end of the lesson, I will be able to :

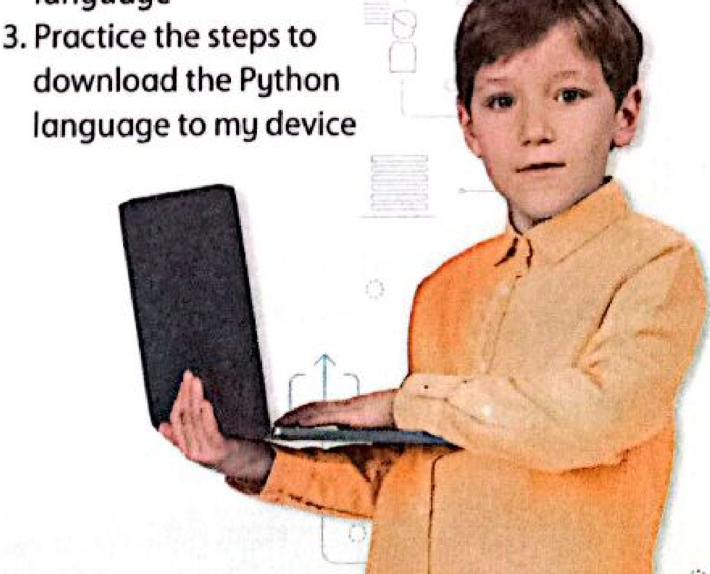
1. Explain the concept of the Python programming language
2. List the uses of the Python language
3. Practice the steps to download the Python language to my device

Lesson 7

Variables in Python

By the end of the lesson, I will be able to :

1. Explain the concept of variables
2. Deduce the types of variables
3. Write a simple programming code in Python



Artificial Intelligence and Programming

Lesson One
Artificial Intelligence Applications — 9

Lesson Two
Sensors — 26

Lesson Three
Robot — 40

Lesson Four
Scratch — 58

Lesson Five
Sprites Area in Scratch — 76

Lesson Six
Principles of Python — 86

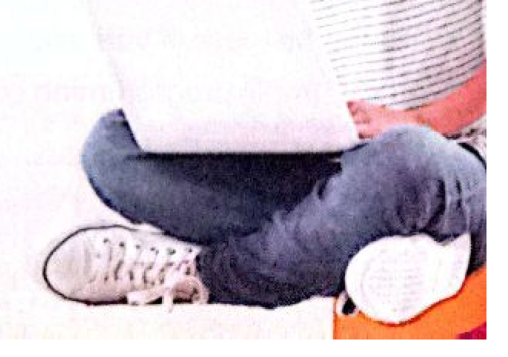
Lesson Seven
Variables in Python — 94

Contents



Part 2

El-Moasser Interactive Notebook — 104





LESSON 1

Artificial Intelligence Applications



Types of Artificial Intelligence : انواع الذكاء الاصطناعى :

- Artificial intelligence is not just one type, but there are many and varied types.

- الذكاء الاصطناعى ليس نوعًا واحدًا فقط، بل هناك أنواع كثيرة ومتنوعة.

What are the types of artificial intelligence ?
ما هى أنواع الذكاء الاصطناعى ؟

- **Narrow AI** الذكاء الاصطناعى الضيق
- **General artificial intelligence [GAI]** الذكاء الاصطناعى العام
- **Super artificial intelligence [SAI]** الذكاء الاصطناعى الفائق

type	نوع	varied	متنوع	artificial intelligence	ذكاء اصطناعى

1 Narrow AI الذكاء الاصطناعي الضيق



- This type of artificial intelligence focuses on performing a specific task, **such as :**

  هذا النوع من الذكاء الاصطناعي يركز على أداء مهمة محددة مثل :

- recognizing faces or translating languages.

  - التعرف على الوجوه أو ترجمة اللغات.

- a robot that can play chess brilliantly, but it cannot do anything else.

  - روبوت يستطيع لعب الشطرنج بشكل رائع، ولكنه لا يستطيع القيام بأي شئ آخر.

2 General artificial intelligence (GAI) الذكاء الاصطناعي العام

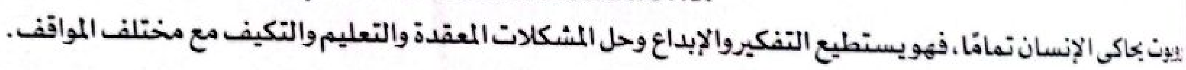
- This type of artificial intelligence is more advanced, and can perform any task that a human can do.

  هذا النوع من الذكاء الاصطناعي هو أكثر تقدمًا، ويستطيع القيام بأي مهمة يمكن للإنسان القيام بها.

Example

A robot that completely mimics a human, as it can think, innovate, solve complex problems, learn, and adapt to different situations.

روبوت يحاكي الإنسان تمامًا، فهو يستطيع التفكير والإبداع وحل المشكلات المعقدة والتعليم والتكيف مع مختلف المواقف.





3 Super artificial intelligence (SAI) الذكاء الاصطناعي الفائق

- This type of artificial intelligence is the most advanced.

  هذا النوع من الذكاء الاصطناعي هو الأكثر تقدمًا.

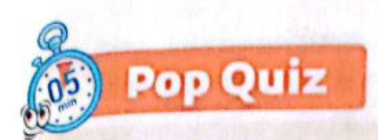
- It can solve problems that are difficult for humans to solve easily.

  يمكنه حل المشكلات التي يصعب على البشر حلها بسهولة.

- It discovers new things that we have never imagined before.

  يمكن أن يكتشف أشياء جديدة لم نكن نتخيلها من قبل.

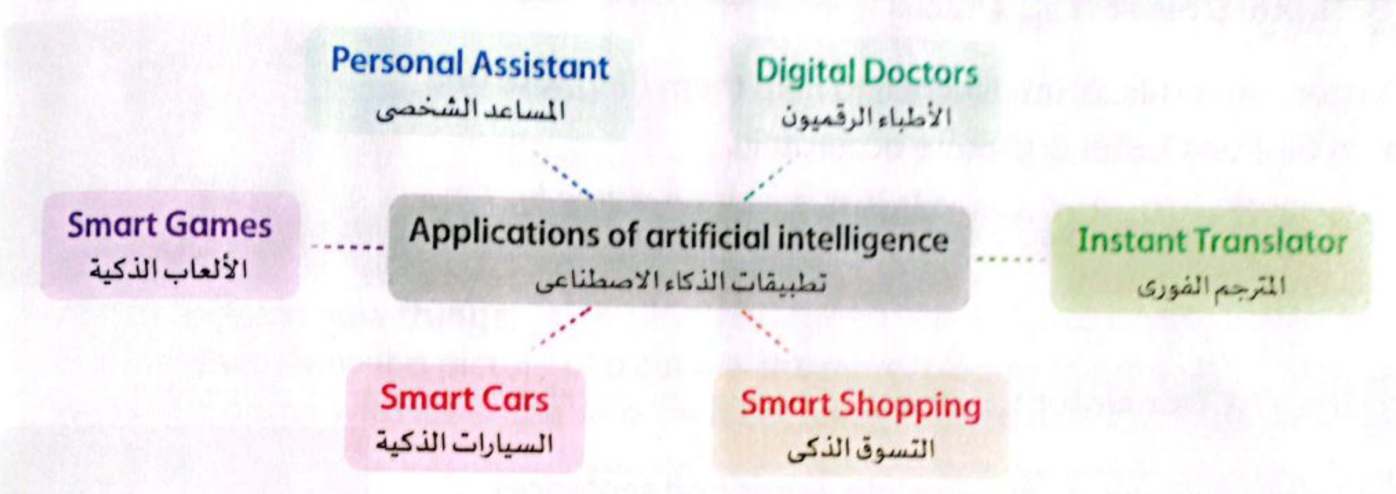
advanced	متقدم	human	إنسان	mimic	
complex	معقد	adapt	يتكيف	situations	
solve	يحل	specific task	مهمة محددة	innovate	
imagine	تخيل	focus	يركز	performing	



▸ **Complete the following sentences :**

1. .... focuses on performing a specific task such as recognizing faces.
2. .... can solve problems that are difficult for humans to solve easily.

Applications of artificial intelligence in daily life : تطبيقات الذكاء الاصطناعى فى الحياة اليومية :



1 Personal Assistant : المساعد الشخصى

▸ Like : (Siri) or (Alexa) مثل (سيرى) أو (أليكسا)

It uses artificial intelligence to understand your commands and perform them.

هو يستخدم الذكاء الاصطناعى لفهم أوامرك والقيام بها.



2 Smart Games : الألعاب الذكية



▸ Some of these games use artificial intelligence to make the game more fun and challenging.

بعض هذه الألعاب تستخدم الذكاء الاصطناعى لجعل اللعب أكثر متعة وتحديًا.

▸ As the characters in the game can learn from their mistakes and become smarter.

فالشخصيات داخل اللعبة تستطيع أن تتعلم من أخطائها وتصبح أكثر ذكاءً.

challenging	تحدى	characters	شخصيات	mistakes	أخطاء
smart	ذكى	commands	أوامر		

3 Smart Cars : السيارات الذكية



- A car driving itself without a driver is the dream of the future that is getting closer to being realized thanks to artificial intelligence.

سيارة تقود نفسها بدون سائق هذا هو حلم المستقبل الذى يقترب من التحقق بفضل الذكاء الاصطناعي.

4 Digital Doctors : الأطباء الرقميون



- Doctors use artificial intelligence to help them diagnose and treat diseases faster and more accurately.

يستخدم الأطباء الذكاء الاصطناعى لمساعدتهم فى تشخيص الأمراض وعلاجها بشكل أسرع وأدق.

5 Instant Translator : المترجم الفوري



- Artificial intelligence can translate words and sentences instantly, making it easier for people to communicate.

الذكاء الاصطناعى يمكنه ترجمة الكلمات والجمل بشكل فورى، مما يسهل التواصل بين الناس.

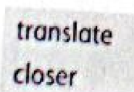
6 Smart Shopping : التسوق الذكى

- Shopping sites offer you suggestions for products that you might like thanks to artificial intelligence.

مواقع التسوق تقدم لك اقتراحات لمنتجات قد تعجبك هذا بفضل الذكاء الاصطناعي.

- Artificial intelligence analyzes your previous purchasing behavior.

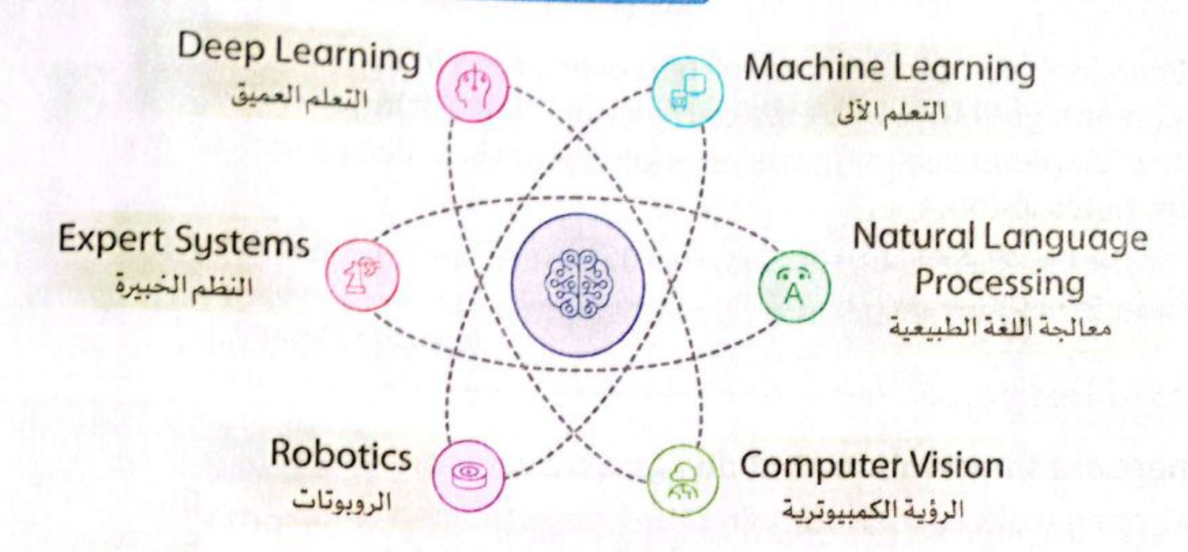
الذكاء الاصطناعى يحلل سلوكك الشرائى السابق.



translate	يترجم	diagnose	تشخيص	accurately	أدق	diseases	أمراض
closer	أقرب	suggestions	اقتراحات	analyze	تحليل	behavior	سلوك



Artificial Intelligence Fields : مجالات الذكاء الاصطناعى



1 Machine Learning - Learning from Mistakes : التعلم الآلى - التعلم من الأخطاء

- **AI has to learn new things.**

The more we show it a picture of a cat → the more it learns to name it. The more we play a game with it → the smarter it becomes, this is called **Machine Learning.**

- **الذكاء الاصطناعى يجب أن يتعلم أشياء جديدة.** كلما أظهرنا له صورة لقطة، تعلم أن يسميها، وكلما لعبنا معه لعبة، أصبح أكثر ذكاءً، هذا ما يسمى **بالتعلم الآلى.**

- **Machine learning**

is similar to when you learn to ride a bike, the more you fall, the better you learn how to balance.

- **التعليم الآلى** يشبه عندما تتعلم ركوب الدراجة، كلما سقطت، تعلمت كيف تتوازن بشكل أفضل.

2 Natural Language Processing – Understanding Languages : معالجة اللغة الطبيعية - فهم اللغات



- Computers understand our different languages and can answer our questions. This is **Natural Language Processing.**

- أجهزة الكمبيوتر تفهم لغاتنا المختلفة ويستطيع أن يجيب على أسئلتنا. هذا هو **معالجة اللغة الطبيعية.**

- It is like an intelligent language translator as it understands written and spoken human language, interprets it, and learns to "speak" human language.

- هو يشبه مترجم اللغات الذكى حيث يفهم اللغة البشرية المكتوبة والمنطوقة، وتفسيرها، ويتعلم "التحدث" بلغة الإنسان.

balance	توازن	like	يشبه	interpret	يفسر
fall	سقط	written	مكتوب	spoken	منطوق

3 Computer Vision - See the World : الرؤية الكمبيوترية – يرى العالم



- AI can look at a picture and tell you everything in it, and it can find your face in a crowded picture, and distinguish between pictures of different animals, which is called Computer Vision.

يستطيع الذكاء الاصطناعى أن ينظر إلى صورة ويخبرك بكل ما فيها، ويمكنه أن يجد وجهك فى صورة مزدحمة بالآخرين، والتمييز بين صور الحيوانات المختلفة وهو يسمى بالرؤية الكمبيوترية (Computer Vision).

4 Robotics : الروبوتات:



- There are smart robots that do : هناك روبوتات ذكية تقوم
  - many tasks such as cleaning the house, playing chess بأعمال كثيرة مثل تنظيف المنزل أو لعب الشطرنج
  - or
  - performing complex and precise surgery إجراء جراحة معقدة ودقيقة
- They have the ability to work with great accuracy even in environments that are dangerous to humans.

– لها القدرة على العمل بدقة فائقة حتى فى البيئات الخطرة على البشر.

5 Simulation of human thinking and decision-making - Expert Systems :

محاكاة لتفكير الإنسان وإتخاذ القرار – الأنظمة الخبيرة :

- Artificial intelligence can
  - solve complex problems. يحل المشكلات المعقدة.
  - make difficult decisions. اتخاذ القرارات الصعبة.
- This is the field of expert systems. It is similar to an intelligent doctor who can diagnose diseases.

– هذا هو مجال الأنظمة الخبيرة : وهو يشبه طبيبًا ذكيًا يستطيع تشخيص الأمراض.

6 Simulation of human learning - Deep Learning : محاكاة لتعلم الإنسان – التعلم العميق :

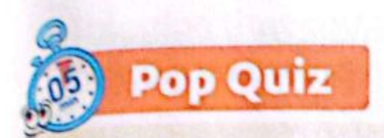
- Deep learning aims to enable computer systems to learn complex tasks in a way similar to the way humans learn.

– يهدف التعلم العميق إلى تمكين الأنظمة الحاسوبية من تعلم المهام المعقدة بطريقة مشابهه للطريقة التى يتعلم بها الإنسان.

- Artificial intelligence has a mind similar to the human mind. It uses this mind to learn things very quickly. Deep learning relies mainly on **neural networks and deep learning.**

– الذكاء الاصطناعى لديه عقل يشبه عقل الإنسان، يستخدم هذا العقل لتعلم الأشياء بسرعة كبيرة. ويعتمد التعلم العميق بشكل أساسى على الشبكات العصبية. **(neural networks and deep learning)**

ability القدرة | complex معقد | diseases امراض



▸ **Put (✓) in front of the correct sentence and (✗) in front of the wrong one :**

1. Doctors use artificial intelligence to help them diagnose and treat diseases faster and more accurately. ( )
2. Robotics can't perform complex and precise surgery . ( )
3. Deep learning aims to enable computer systems to learn complex tasks in a way similar to the way humans learn. ( )

Teachable Machine : التعلم الآلى :

- It is an easy-to-use tool that helps you create intelligent models to recognize images, sounds, and movements. هى أداة سهلة الاستخدام تساعدك على إنشاء نماذج ذكية للتعرف على الصور والأصوات والحركات.



- Imagine if you could teach a computer to recognize objects in the same way you learn! This is exactly what **Teachable Machine** does.

تخيل لو أنك تستطيع أن تعلم الكمبيوتر التعرف على الأشياء بنفس الطريقة التى تتعلم بها أنت ! هذا هو بالضبط ما يفعله موقع "Teachable Machine".

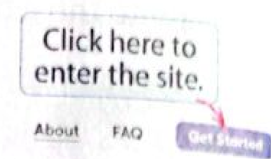
Model Building Training : تدريب بناء النموذج

Note

It is preferable to update your internet browser and work on the Microsoft Edge browser. من الأفضل تحديث متصفح الإنترنت لديك والعمل على متصفح Microsoft Edge.

- Click on the following link to enter the website https://teachablemachine.withgoogle.com/

Website login window layout : شكل نافذة الدخول للموقع



Teachable Machine

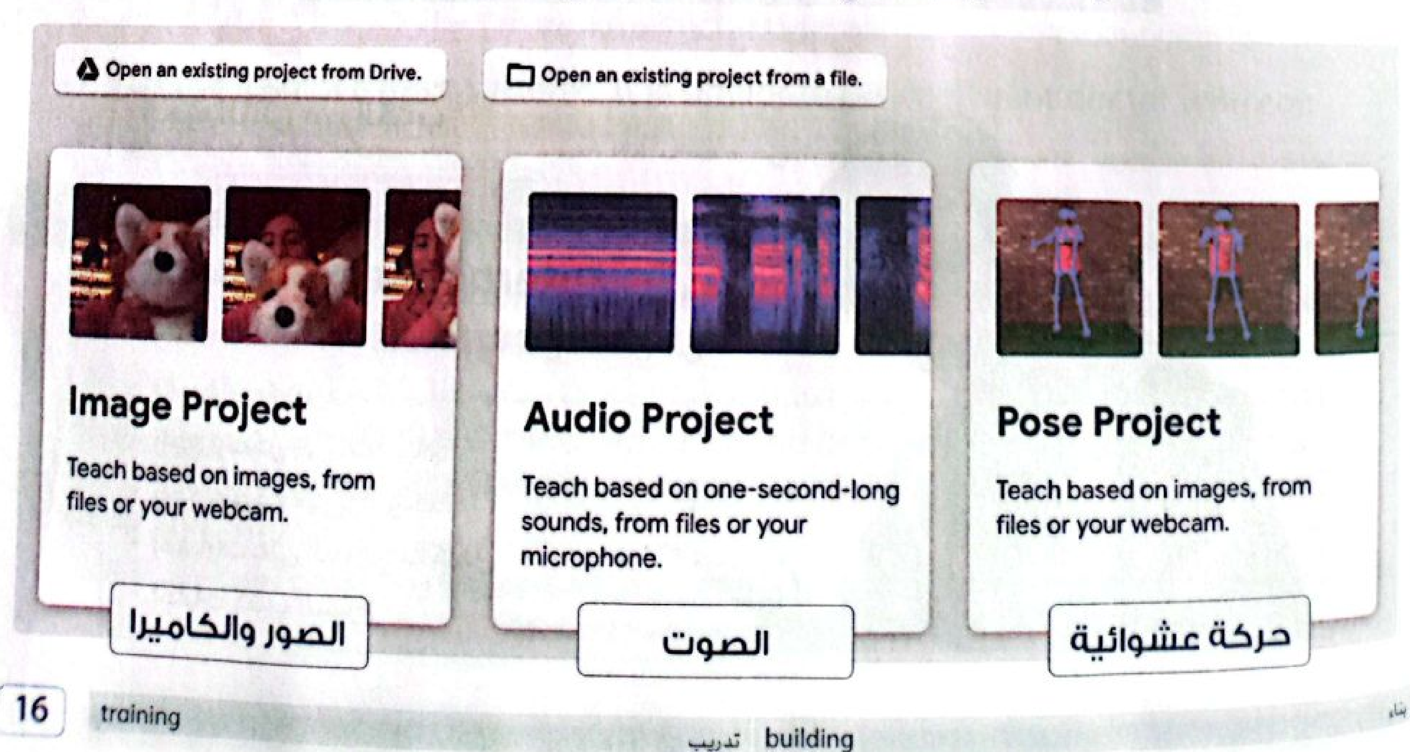
Train a computer to recognize your own images, sounds, & poses.

A fast, easy way to create machine learning models for your sites, apps, and more – no expertise or coding required.





Home screen layout of the site : شكل الشاشة الرئيسية للموقع



▸ **Imagine that you are training a young child to do new things! First, you need to teach him the names of things.**

- تخيل أنك تقوم بتدريب طفل صغير على أشياء جديدة! في البداية، تحتاج إلى تعليمه أسماء الأشياء.

1. You show the young child a picture of a cat and say, → "This is a cat."

- تُظهر للطفل الصغير صورة قطة وتقول له "هذه قطة".

→ then show him a picture of a dog and say, → "This is a dog."

ثم تُظهر له صورة كلب وتقول له "هذا كلب".

2. You are telling the child what things he sees → just as you teach him the names of "letters" and "numbers".

- أخبر الطفل ما هي الأشياء التي يراها تمامًا كما تعلمه أسماء الحروف والأرقام.

3. The child's little brain starts to understand the difference between a "cat" and a "dog".

- العقل الصغير للطفل يبدأ في استيعاب الاختلاف بين "قطة" و"كلب".

4. The child has learned so well that he can now → tell the difference between a "cat" and "a dog".

- لقد تعلم الطفل جيدًا الآن الفرق بين "قطة" و"كلب".





Ready to explore the world of photography ? Our first project will take you on an exciting journey !

جاهزون لاستكشاف عالم الصور؟ مشروعنا الأول سيأخذكم في رحلة ممتعة!

Image Project

Teach based on images, from files or your webcam.

The images of numbers from "0 - 9" are prepared in the form of images of files stored on the computer.

يتم تحضير صور الأرقام من "٠ - ٩" في صور ملفات مخزنة على الكمبيوتر.

New Image Project

Standard image model

Best for most uses

224X224px color images

Export to TensorFlow, TFLite, and TF.js

Model size: around 5mb

explore يكتشف | files ملفات | webcam كاميرا

For a Computer : بالنسبه للكمبيوتر

- Just like the child, scientists try to train a computer to understand pictures and sounds.

- مثل الطفل، يحاول العلماء تدريب الكمبيوتر على استيعاب الصور والأصوات.

- In the same way of learning the child, the computer has learned to recognize different things and we can use it for a lot of fun things.

- بنفس طريقة تعليم الطفل ، يتعلم الكمبيوتر أن يدرك أشياء مختلفة ويمكننا أستخدامه للعديد من الأشياء الممتعة.



Imagine تخيل

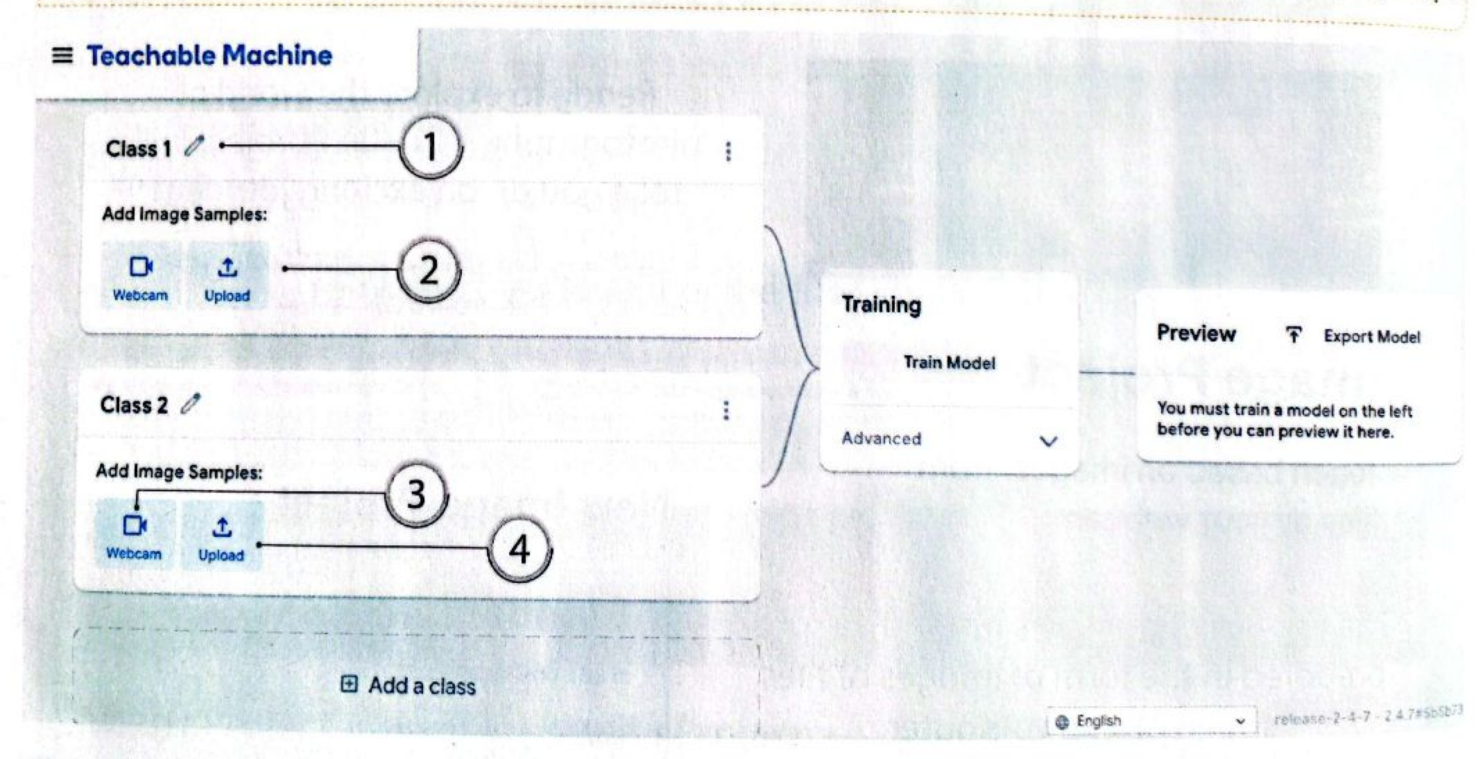
- We want to teach the computer to recognize numbers → we start by giving him pictures of numbers from "0 - 9" and telling him what number is in each picture.

- يمكننا أن نبدأ بإعطائه صورًا للأرقام.
- عندما نريد أن نعلم الكمبيوتر كيفية التعرف على الأرقام من "٠ - ٩" فنخبره بالرقم فى كل صورة.

↓

- After a while, the computer will be able to look at any number and tell us what it is.

- بعد فترة سيكون الكمبيوتر قادراً على التعرف على أى رقم وأخبارنا به.



1. Classification that includes a group of images that belong to a specific category such as images of numbers "from 0-9" and another classification that includes images of alphabet letters.

١. التصنيف الذى يضم مجموعة الصور التى تخص فئة معينة مثل صور الأرقام من "٠ - ٩" وتصنيف آخر يضم صور الحروف الهجائية.

2. Upload images of numbers in (Class 1).

٢. تحميل صور الأرقام في (Class 1).

3. Open the camera, prepare images of numbers on paper boards" and have the model take them in (Class 2).

٣. قم بفتح الكاميرا، جهز صور للأرقام على لوحات ورقية "وأجعل النموذج يقوم بالتقاطها في (Class 2).

Note

The images were provided to the model in the form of files or he takes them through the Web camera.

لاحظ : تم توفير الصور للنموذج في صورة ملفات أو يلتقطها هو من خلال Web camera.

4. The artificial intelligence model is trained on the image categories that were given to it.

٤. يتم تدريب نموذج الذكاء الاصطناعي على فئات الصور التي تم إعطائها له.

5. Add more image categories when needed, for example "adding special symbols".

٥. إضافة المزيد من فئات الصور عند الحاجة مثلًا "إضافة الرموز الخاصة".

6. After that, the model can be given an image that determines for us which category of images it follows.

٦. بعد ذلك يمكن إعطاء النموذج صورة يحدد لنا هي تتبع أي فئة من صور.

Save the project : حفظ المشروع

1. Save the project on Google Drive....

١. حفظ المشروع على ....Google Drive

2. Download the project to the device...

٢. تحميل المشروع على الجهاز.

Teachable Machine
- New Project
- Open project from Drive
- Save project to Drive ← 1
- View project in Drive
- Make a copy in Drive
- Sign out of Drive
- Open project from file
- Download project as file ← 2

Practical example : مثال عملي

- Suppose you want to make a game where you control a character on the screen with your hand movement, here are the steps :

- لنفترض أنك تريد أن تصنع لعبة حيث تتحكم في شخصية على الشاشة بحركة يدك، إليك الخطوات :







1 Training : : التدريب

You record your hand in different positions (such as raising the hand, lowering it, moving it right and left).

تقوم بتصوير يدك فى أوضاع مختلفة (مثل رفع اليد، خفضها، تحريكها يميناً ويسارًا.)

2 Recognition : : التعرف

Teachable Machine learns to associate each position of your hand with a specific movement of the character on the screen.

يعلم "Teachable Machine" أن يربط كل وضع من أوضاع يدك بحركة معينة للشخصية على الشاشة

3 Game : : اللعبة

When you move your hand in front of the camera, the character on the screen moves according to what the computer has learned.

عندما تحرك يدك أمام الكاميرا، تتحرك الشخصية على الشاشة وفقاً لما تعلمه الكمبيوتر.

Example application : تطبيق المثال

1 Access the site : : الدخول إلى الموقع

Open your browser and type **"Teachable Machine"** in the search bar, then access the site.

افتح المتصفح الخاص بك واكتب فى شريط البحث " Teachable Machine" ثم ادخل إلى الموقع.

2 Select the training model : : اختيار نموذج التدريب

We find several options, choose the option related to image recognition (**Image**).

نجد عدة خيارات، اختر الخيار الذى يتعلق بالتعرف على الصور (Image).

3 Prepare the camera → تجهيز الكاميرا

The site will ask you to choose to upload images (upLoad) or allow it to use your device's camera (**web**).



- سيطلب منك الموقع إختيار رفع الصور (upLoad) أو السماح له باستخدام كاميرا جهازك (web) .

↓

Click on the camera (web) and make sure that the lighting is good and the camera background is simple so that the computer focuses on the movement of your hand.

- اضغط على الكامير (web) وتأكد من أن الإضاءة جيدة وأن خلفية الكاميرا بسيطة حتى يركز الكمبيوتر على حركة يدك.

screen شاشة options خيارات

4 Train the computer. تدريب الكمبيوتر.

5 Create Classes. إنشاء الفئات.

Create at least two classes (Class 1) and (Class 2), for example (Class 1) "Raised hand" and (Class 2) "Shaky hand".

- قم بإنشاء فئتين (Class 1)، (Class 2) على الأقل، مثلا (Class 1) يد مرفوعة و (Class 2) يد مهزوزة.

6 Record examples. تسجيل الأمثلة.

In front of each category → record several examples of the corresponding hand movement.

- أمام كل فئة، قم بتسجيل عدة أمثلة لحركة اليد المقابلة.

For example, in front of the category "**raised hand**", raise your hand several times and each time raise it with a specific movement or a different shape and so on in front of the category "**shaky hand.**"

- مثلاً أمام "فئة يد مرفوعة" ارفع يدك عدة مرات وفي كل مرة ارفعها بحركة معينة أو شكل معين وهكذا أمام فئة "يد مهزوزة".

7 Review examples. مراجعة الأمثلة.

Make sure that the examples are clear and that the computer understands the difference between the two movements.

- تأكد من أن الأمثلة واضحة وأن الكمبيوتر يفهم الفرق بين الحركتين.

8 Training. التدريب.

After you finish taking the pictures, click on the "**Train Model**" button to teach the computer these movements.

- بعد الانتهاء من التقاط الصور، اضغط على زر "**Train Model**" لتعليم الكمبيوتر هذه الحركات.

9 Test the model. اختبار النموذج.

After you finish training, the site will ask you to test the model.

- بعد الانتهاء من التدريب، سيطلب منك الموقع اختبار النموذج.

Camera → Point the camera at your hand and perform the movements you trained.

- **الكاميرا**: وجه الكاميرا إلى يدك وقم بعمل الحركات التي قمت بتدريبها.

point	يوجه	click	يضغط / ينقر	movement	حركة	raise	يرفع

Results → You will see that the computer will try to guess the movement you are performing.

- النتائج : سترى أن الكمبيوتر سيحاول تخمين الحركة التى تقوم بها.

▸ **Save the model :** حفظ النموذج :

- If you like the model, you can save it and use it in other projects.

- إذا أعجبك النموذج يمكنك حفظه واستخدامه فى مشاريع اخرى.

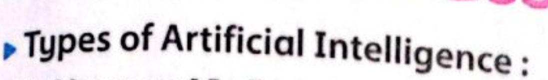
Ideas for your projects

- **Recognize faces :** Train the computer to recognize the faces of your friends and family.
  - تعرف على الوجوه : قم بتدريب الكمبيوتر على التعرف على وجوه أصدقائك وعائلتك.
- **Create a motion control game :** Use your body movements to control characters in a video game.
  - إنشاء لعبة تحكم بالحركة : استخدم حركات جسمك للتحكم فى شخصيات فى لعبة فيديو.
- **Image classification :** Teach the computer to classify images into different categories (such as animals, food, colors).
  - تصنيف الصور : علم الكمبيوتر أن يصنف الصور إلى فئات مختلفة (مثل الحيوانات ،الطعام ،الألوان).
- **Create a robot that follows you :** Build a small robot that follows you wherever you go.
  - إنشاء روبوت يتبعك : قم بإنشاء روبوت صغير يتبعك إينما ذهبت.

guess	يخمن	classify	يصنف	recognize	يدرك / يتعرف

Stop here !





نقاط هامة وعبارات استرشادية تمكنك من تلخيص وإتقان الدرس.



استمع إلى ملخص الدرس

Lesson Summary

- **Types of Artificial Intelligence :**
  1. **Narrow AI :** Focus on performing a specific task, such as facial recognition or language translation.
  2. **GAI :** More advanced; it can preform all human tasks, such as thinking and problem-solving.
  3. **SAI :** Highly advanced; it solve problems that are difficult for humans to solve easily.
- **Applications of artificial intelligence in daily life :**
  - **Personal Assistant :** Like Siri and Alexa, for understanding and executing voice commands.
  - **Smart Games :** To develop, characters that learn and improve.
  - **Smart Cars :** Driving cars without a driver.
  - **Digital Doctors :** help doctors diagnose and treat diseases.
  - **Instant Translator :** Makes communication easier as it translate words and sentences instantly.
  - **Smart Shopping :** Analyzing purchasing behavior to provide personalized recommendations.



How to deal with the exam

كلمات و عبارات إسترشادية تساعدك على حل أسئلة الامتحان.

Topic	Guiding words	Exam items
Artificial Intelligence Applications	Narrow AI	Narrow AI focuses on a specific task.
	Super AI	Super AI can solve problems that are difficult for humans to solve easily.
	Personal Assistant	Personal assistants, like Siri or Alexa, use AI to understand your commands and perform them.
	diagnose - treat	Doctors use AI to help them diagnose and treat diseases faster and more accurately.
	computers - questions	Computers can understand different languages and answer our questions.
	picture - tell	AI can look at a picture and tell you everything in it.

General Exercises

On Lesson One



يمكنك حل التدريب
وتصويبه إلكترونيا



▸ If you got 🔴 you need to revise the lesson again.

ممتاز 🔵 جيد جدا 🟢 جيد 🟡 غير جيد 🔴

قم بتقييم نفسك بالعلامات الموضحة وإذا حصلت على 🔴 (غير جيد) قم بمراجعة الدرس مرة أخرى من الصفحة السابقة.

El-Moasser Exercises

1 Choose the correct answer from a, b, c or d.

1. .... is a type of artificial intelligence that focuses on one specific task.
   a. General AI b. Super AI c. Personal AI d. Narrow AI
2. .... use artificial intelligence to make the game more fun and challenging.
   a. Smart cars b. Smart games
   c. Digital numbers d. Instant translator
3. Which of the following is an application of AI in daily life ?
   a. Writing with a pen b. Traditional cars
   c. Smart cars d. All of them
4. .... is one of the roles performed by personal assistants like Siri and Alexa.
   a. Performing surgeries b. Understanding our commands
   c. Creating computer programs d. Teaching languages
5. "................" is the main goal of deep learning.
   a. Performing specific tasks without learning
   b. Simulating human learning through neural networks
   c. Performing only mathematical calculations
   d. Translating written texts
6. Machine learning helps to ....
   a. reducing the system's ability to adapt
   b. enabling systems to learn from data and improve their performance
   c. interacting with sound only
   d. operating robots only
7. .... is used in instant translation.
   a. Natural Language Processing b. Computer Vision
   c. Expert Systems d. Deep Learning only

2 Complete the following sentences with the appropriate words in brackets.

(Computer Vision - General AI - Natural Language Processing - Teachable Machine - Machine Learning)

1. .... is a type of artificial intelligence that can perform all tasks a human can do.
2. The ability of devices to understand written and spoken human language is .... using artificial intelligence.

3. .... is a website used to create smart models for classifying images, sounds, and movements.
4. The technology that helps artificial intelligence recognize and analyze images is ....
5. A technology that makes artificial intelligence learn from mistakes to improve its performance is ....

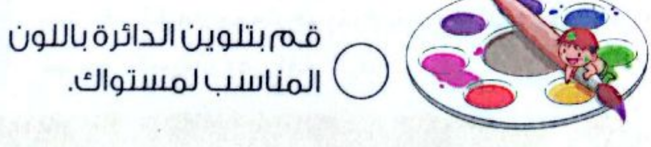
3 Put (✓) in front of the correct sentence and (×) in front of the wrong sentence .

1. An AI model can be trained using images directly from the camera. ( )
2. Machine learning enables AI to learn from mistakes and improve performance. ( )
3. Smart robots cannot work in environments that are dangerous to humans. ( )
4. General artificial intelligence is able to learn and adapt to new situations like humans. ( )
5. Artificial intelligence can be used in analyzing data to improve online shopping. ( )
6. Super AI focuses on one task. ( )
7. Personal assistants like Siri rely on artificial intelligence to understand our commands. ( )

Student's Book Exercises

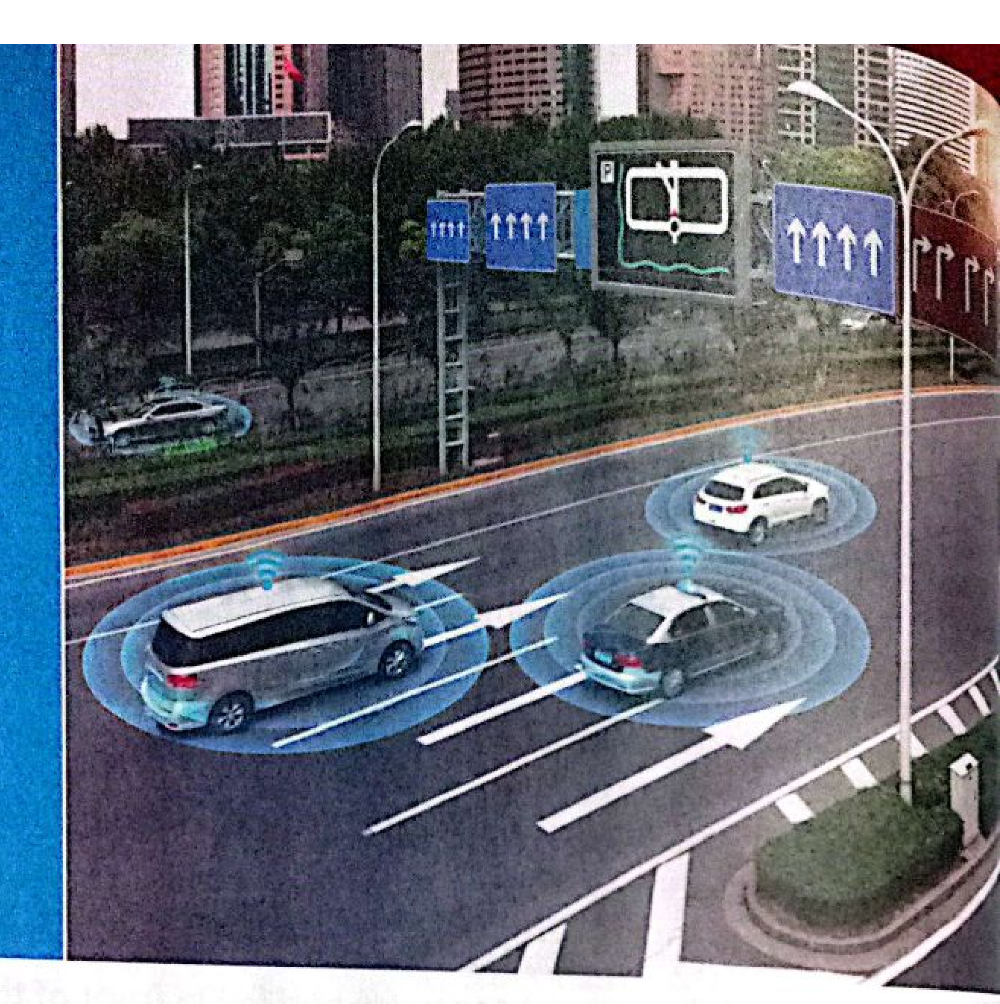
- **Put (✓) in front of the correct sentence and (×) in front of the wrong sentence.**

1. Artificial intelligence is only used in the video game industry. ( )
2. Artificial intelligence can help doctors diagnose diseases. ( )
3. Self-driving cars depend entirely on artificial intelligence. ( )
4. Artificial intelligence can learn new things slowly. ( )
5. Artificial intelligence is a science of computer science. ( )
6. For artificial intelligence to become intelligent, it needs small amounts of information. ( )
7. Artificial intelligence is only one type. ( )
8. Narrow artificial intelligence can perform any tasks that a human can perform. ( )
9. General artificial intelligence is more advanced. ( )
10. General artificial intelligence focuses on performing a specific task. ( )
11. Super artificial intelligence can solve specific problems. ( )
12. Smart Games are used to make playing games more fun. ( )
13. Instant Translator is used to facilitate communication between people. ( )
14. Smart Shopping gives you suggestions for products you might like. ( )
15. Natural Language Processing is like a machine language translator. ( )
16. Robots are very good at doing a lot of things with great accuracy. ( )





Sensors



Learn

Sensors أجهزة الاستشعار

- are simple devices that play a major role in our daily lives.
  هى أجهزة بسيطة تلعب دورًا رئيسيًا فى حياتنا اليومية.
- They sense changes the surrounding environment.
  هى أجهزة تستشعر التغيرات فى البيئة المحيطة.
- They convert changes into signals that help machines make appropriate decisions based on them.
  تقوم بتحويل هذه التغيرات إلى إشارات لتتكمن الآلات والأجهزة من فهمها واتخاذ القرارات المناسبة.
- Sensors are considered the eyes and ears of machines.
  تعتبر أجهزة الاستشعار عين وأذن الآلات.

For example : Sensors are used in :

- robots • الروبوتات
- smartphones • الهواتف الذكية
- modern cars • السيارات الحديثة
- alarms • أجهزة الإنذار



How do sensors work ? كيف تعمل أجهزة الاستشعار؟

- A sensor is a translator that translates those sensations such as : heat, light or sound **into** a language the computer understands, which is the language of numbers.
  جهاز الاستشعار هو مترجم يقوم بترجمة تلك الأحاسيس مثل الحرارة، الضوء أو الصوت **إلى** لغة يفهمها الكمبيوتر وهى لغة الأرقام.

appropriate	مناسبة	decisions	قرارات	machines	آلات
translator	مترجم	language	لغة	sensations	أحاسيس

Sensors work through 3 main steps :

وتعمل أجهزة الاستشعار من خلال ٣ خطوات رئيسية:



Sensing الاستشعار	Signal Conversion تحويل الإشارات	Transmission الإرسال

Sensing الاستشعار
Captures information from the surrounding environment (such as heat, light or sound). تلتقط المعلومات من البيئة المحيطة مثل الحرارة، الضوء، الصوت.

Signal Conversion تحويل الإشارات
Converts this information into electrical signals that can be read by electronic devices. تحول هذه المعلومات إلى إشارات كهربائية يمكن أن تقرأها الأجهزة الإلكترونية.

Transmission الإرسال
Signals are sent to another device to display the results or perform a specific operation. ترسل الإشارات إلى جهاز آخر ليعرض النتائج أو ينفذ عملية معينة.
For example, a thermometer displays the temperature result on a digital screen. فمثلًا الترمومتر يظهر نتيجة درجة الحرارة على الشاشة الرقمية.

Pop Quiz

▶ **Choose the correct answer from a, b, c or d.**

1. Sensors play a major role in our daily lives, from their use in ....
   a. robots b. alarms c. smartphones d. all of them
2. Sensors translates sensations such as heat into the language of ....
   a. letters b. numbers c. emojis d. words
3. .... stage is the third stage in the operation of sensors.
   a. Sensing b. Signal conversion c. Transmission d. None of them

The importance of sensors for robots : أهمية أجهزة الاستشعار للروبوتات:

Imagine robots without sensors: تخيل روبوتات بدون أجهزة استشعار:

- They would be a person walking with their eyes closed and their ears covered.
  ستكون مثل شخص يمشي مغمض العينين ومغطى الأذنين.
- They cannot recognize what is happening around them. لا يمكنها أن تتعرف على ما يحدث حولها.

temperature	درجة حرارة	signal	اشارة	display	يعرض
convert	يحول	conversion	يحول	digital screen	شاشة رقمية
electronic devices	اجهزة الكترونية				



- They can't recognize those around them or how to behave.

• ولا تستطيع أن تتعرف على من حولها أو كيف تتصرف.

- They represent the "senses" of the robot, helping it to see, hear, sense and even touch things around it.

• فهي تمثل «حواس» الروبوت فتساعده على الرؤية، السماع، الاستشعار، وحتى لمس الأشياء من حوله.



▶ **Put (✓) in front of the correct sentence and (✗) in front of the wrong one :**

1. The sensing phase in which information from the surrounding environment such as heat, light and sound are captured. ( )
2. Sensors are complex devices that are difficult to operate. ( )
3. Sensors represent the "robot senses". ( )
4. The transmission stage is the third stage in the work of sensors. ( )

Types of robotic sensors: أنواع أجهزة الاستشعار الروبوتية :

- **There are many different types of sensors used in robots and each type has a specific function.**

- هناك العديد منها ولكل نوع منها وظيفة معينة. وهذه بعض الأمثلة لأجهزة الاستشعار:

Distance Sensors أجهزة استشعار المسافة	Measure the distance between the robot and surrounding obstacles. تقيس المسافة بين الروبوت والعوائق المحيطة به. This helps the robot avoid collisions. فهذا يساعد الروبوت على تجنب الاصطدام.	
Light Sensors أجهزة استشعار الضوء	Used in robots that operate in places where light is variable, such as home robots, these sensors help the robot adapt to changing light conditions. تستخدم في الروبوتات التي تعمل في أماكن يكون فيها الضوء متغيرا، مثل الروبوتات المنزلية، هذه المستشعرات تساعد الروبوت على التكيف مع تغيرات الإضاءة.	
Sound Sensors أجهزة استشعار الصوت	These are used in robots that react to sounds, **for example:** robots that can respond to voice commands. تستخدم في الروبوتات التي تتفاعل مع الأصوات، مثال: الروبوتات التي يمكنها الاستجابة للأوامر الصوتية.	

robot روبوت | obstacles عوائق | voice commands أوامر صوتية
distance مسافة | light conditions تغيرات الاضاءة | variable متغير

Motion Sensors أجهزة استشعار الحركة	These detect movement and changes in direction. These sensors help the robot navigate and interact with surrounding objects. تكتشف الحركة وتغيرات الاتجاه، تساعد هذه المستشعرات الروبوت على التنقل والتفاعل مع الأشياء المحيطة.	
Special Sensors أجهزة استشعار الخاصة	Such as temperature and humidity sensors. مثل أجهزة استشعار درجة الحرارة، والرطوبة.	

For examples :

Sensors some electronic devices that use

بعض الاجهزة الالكترونية التى تستخدم بها اجهزة الاستشعار

Self-driving cars السيارة ذاتية القيادة



rely heavily on sensors to see the road and make decisions.
تعتمد بشكل كبير على أجهزة الاستشعار لرؤية الطريق واتخاذ القرارات.

Surgical robot الروبوت الجراح



uses precise sensors to perform surgeries.
يستخدم أجهزة استشعار دقيقة لإجراء العمليات الجراحية.

Vacuum cleaner robot روبوت المكنسه الكهربائية



uses sensors to avoid obstacles and clean under furniture.
يستخدم أجهزة استشعار لتجنب العقبات والتنظيف تحت الأثاث.

Types of distance sensors : أنواع أجهزة استشعار المسافة

- The types of distance used in
  - **robots**
  - **smart devices vary**

تتنوع أنواع أجهزة استشعار المسافة المستخدمة فى الروبوتات والأجهزة الذكية.

Types of distance sensors

- Ultrasonic Sensors — أجهزة استشعار الموجات فوق صوتية
- Laser Rangefinders — أجهزة استشعار الليزر
- Visible light Sensors — أجهزة استشعار الضوء المرئى
- Infrared Sensors — أجهزة استشعار تحت الحمراء
- Time of flight sensors — أجهزة استشعار التايم أوف فلايت

movement	حركة	interact	تفاعلي	furniture	أثاث
navigate	يتنقل - تنقل	humidity	رطوبة	surgeries	عمليات جراحية

1 Ultrasonic Sensors ١. أجهزة استشعار الموجات فوق الصوتية



Working principle :

- These devices emit high-frequency sound waves.

مبدأ العمل: تصدر هذه الأجهزة موجات صوتية عالية التردد.

- Then receive the returning waves after they bounce off an object.

ثم تستقبل الموجات العائدة بعد ارتدادها عن جسم ما.

- By measuring the time it takes for the wave to return, the distance to the object can be calculated.

ومن خلال قياس الوقت الذى تستغرقه الموجة حتى العودة، يمكن حساب المسافة إلى الجسم.

Examples :

Vacuum cleaner robots	These devices are used to locate furniture and obstacles to avoid colliding with them. روبوتات المكنسة الكهربائية: تستخدم هذه الأجهزة لتحديد موقع الأثاث والعوائق لتجنب الاصطدام بها.
Parking systems	They help measure the distance between the car and surrounding obstacles. أنظمة ركن السيارات: تساعد في قياس المسافة بين السيارة والعوائق المحيطة بها.
Fluid levels	They are used to measure the level of fluids in tanks and reactors. مستويات السوائل: تستخدم لقياس مستوى السوائل في الخزانات والمفاعلات.

2 Laser Rangefinders ٢. أجهزة استشعار الليزر



Working principle :

- These devices emit a laser beam.

مبدأ العمل: تصدر هذه الأجهزة شعاعًا ليزريًا.

- They measure the time it takes for the beam to return after bouncing off the object.

تقيس هذه الأجهزة الوقت الذى يستغرقه الشعاع للعودة بعد إرتدادة عن الجسم.

- They're characterized by high accuracy and a longer range compared to ultrasonic devices.

تتميز هذه الأجهزة بدقة عالية ومدى أطول مقارنة بالأجهزة فوق الصوتية

Examples :

3D laser scanners	They are used to create 3D models of spaces. ماسحات الليزر ثلاثية الأبعاد: تستخدم في إنشاء نماذج ثلاثية الأبعاد للمساحات.
Ground scanning systems	They are used in geological and archaeological surveys. أنظمة المسح الأرضي: تستخدم في المسح الجيولوجي والمسح الأثري.

fluids سوائل	colliding اصطدام	emit يصدر	
tanks خزانات	distance مسافة	survey مسح	
reactors مفاعلات			

Industrial measurement systems	They are used to measure dimensions with high accuracy in various industries. أنظمة القياس الصناعية تستخدم في قياس الأبعاد بدقة عالية في الصناعات المختلفة.

3 Visible Light Sensors ٣. أجهزة استشعار الضوء المرئي



Working principle : These devices use digital cameras to analyze images and determine the distance to objects based on the size and distortion of the image.

مبدأ العمل: تستخدم هذه الأجهزة كاميرات رقمية لتحليل الصور وتحديد المسافة إلى الأجسام بناءً على حجم الصورة وتشوهها.

Examples :

Self-driving car cameras	Used to determine the distance to other cars, pedestrians, and traffic signals. تستخدم كاميرات السيارات لتحديد المسافة إلى السيارات الاخرى والمشاة وإشارات المرور.
Industrial vision systems	Used to inspect products and identify errors. تستخدم أنظمة الرؤية الصناعية فى فحص المنتجات وتحديد الاخطاء.
Augmented reality systems	Used to integrate digital elements with the real world. تستخدم أنظمة الواقع المعزز لدمج العناصر الرقمية مع العالم الحقيقي.

4 Infrared Sensors ٤. أجهزة استشعار الأشعة تحت الحمراء



Working principle : These devices emit infrared rays and then receive the returning rays after they bounce off the object, widely used in consumer electronics.

مبدأ العمل: تصدر هذه الأجهزة أشعة تحت حمراء ثم تستقبل الأشعة العائدة بعد ارتدادها عن الجسم، تستخدم على نطاق واسع في الأجهزة الإلكترونية الاستهلاكية.

Examples :

Remote controls	Infrared rays are used to communicate with electronic devices. أجهزة التحكم عن بعد: تستخدم الأشعة تحت الحمراء للتواصل مع الأجهزة الإلكترونية.
Non-contact thermometers	Used to measure body temperature without the need for direct contact. أجهزة قياس الحرارة اللاتلامسية: تستخدم لقياس درجة حرارة الجسم دون الحاجة إلى التلامس المباشر.

analyze يحلل	traffic signals اشارات المرور	determine يحدد	
pedestrians المشاة	consumer مستهلك	integrate يدمج	

5 Time of Flight sensors ٥. أجهزة استشعار التايم أوف فلايت



- **Working principle :**
  - It depends on measuring the time it takes for a light pulse to reach an object and return to it.

مبدأ العمل: تعتمد على قياس الوقت الذي يستغرقه نبضة ضوئية للوصول إلى جسم ما والعودة إليه.

  - It's characterized by high accuracy and high speed.

تتميز بدقة عالية وسرعة عالية.

Examples :

3D sensors	Used to create 3D models of objects. أجهزة الاستشعار ثلاثية الأبعاد: تستخدم في إنشاء نماذج ثلاثية الأبعاد للأشياء.
Motion tracking systems	Used in video games and virtual reality systems. أنظمة تتبع الحركة: تستخدم في ألعاب الفيديو وأنظمة الواقع الافتراضي.

Pop Quiz

1. Put (✓) in front of the correct sentence and (✗) in front of the wrong one :

1. Time of Flight sensors measure the time it takes for a pulse of light to reach and return to an object. (   )
2. Ground scanning systems are laser sensor systems. (   )

2. Write the scientific term :

1. These devices emit high-frequency sound waves, then receive the waves returning after they bounce off an object. (..................)
2. It uses precise sensors to perform surgical operations. (..................)

Factors for choosing the appropriate type of sensor عوامل اختيار نوع جهاز الاستشعار المناسب

Choosing the appropriate type of sensor depends on several factors, including:

إن اختيار نوع جهاز الاستشعار المناسب يعتمد على عدة عوامل منها:

1. **Required range:** The maximum distance that the device must measure.
   المدى المطلوب: المسافة القصوى التي يجب على الجهاز قياسها.
2. **Required accuracy:** The required measurement accuracy. الدقة المطلوبة: مدى دقة القياس المطلوبة.
3. **Operating environment:** The environmental conditions in which the device will operate (lighting, temperature, humidity).
   البيئة التشغيلية: الظروف البيئية التي سيعمل فيها الجهاز (الإضاءة، الحرارة، الرطوبة).
4. **Cost:** The cost of the device and installation. التكلفة: هي تكلفة الجهاز والتركيب.

light pulse نبضة ضوئية | factors عوامل | virtual reality واقع افتراضي | high accuracy دقة عالية | cost

Notice

By choosing the appropriate device, robots and smart devices can interact with their environment more accurately and effectively.

لاحظ: باختيار الجهاز المناسب، يمكن للروبوتات والأجهزة الذكية أن تتفاعل مع بيئتها بشكل أكثر دقة وفعالية.

Daily applications of sensors: التطبيقات اليومية لأجهزة الاستشعار

- Sensors are used daily in our lives, and the most prominent of these applications are:

ـ تستخدم اجهزة الاستشعار بشكل يومى فى حياتنا، ومن ابرز هذه التطبيقات:

In smartphones

There are sensors that help in
- Taking pictures — التقاط الصور
- adjusting the light level — ضبط مستوى الإضاءة
- determine the location of the phone — تحديد موقع الهاتف

In modern cars

Sensors are used to
- determine speed — تحديد السرعة
- warn of collisions — التحذير من الاصطدام
- help the driver park his car — مساعدة السائق فى ركن السيارة

In smart homes

Motion sensors turn on the lights automatically when someone enters the room. مستشعرات الحركة تضيء الأضواء تلقائيا عند دخول شخص الغرفة.

Phone microphone

It is a sound sensor that converts the sound you pick up into electrical signals that can be understood by the phone.

هو جهاز استشعار للصوت يحول الصوت الذي تلتقطه إلى إشارات كهربائية يمكن فهمها بواسطة الهاتف.

Motion sensor in games

When you tilt your phone to the right or left while playing a game, the motion sensor is what tells the game to change the direction of the character.

عندما تميل هاتفك جهة اليمين أو اليسار أثناء لعب لعبة ما، فإن جهاز استشعار الحركة هو الذي يخبر اللعبة بأن تقوم بتغيير اتجاه الشخصية.

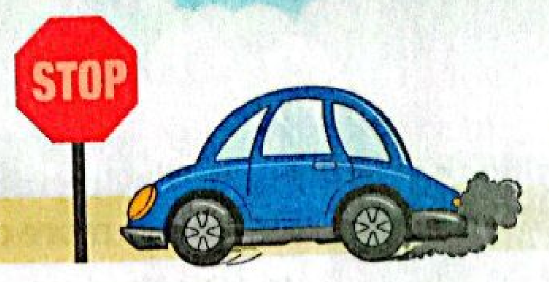
Touch screen

It is a group of small sensors that sense where your finger touches the screen.

هي عبارة عن مجموعة من أجهزة الاستشعار الصغيرة التي تستشعر مكان لمس إصبعك على الشاشة.

screen	شاشة	location	موقع	tilt	يميل
pick up	يلتقط	speed	سرعة	character	شخصية
warn	تحذير				

Stop here !





استمع إلى
ملخص الدرس

نقاط هامة وعبارات استرشادية تمكنك من تلخيص وإتقان الدرس.

Lesson Summary

- Sensors are simple devices that play a major role in our daily lives.

- هى أجهزه بسيطة تلعب دورًا رئيسيًا فى حياتنا اليومية.

- Sensors convert information into signal that help machines make appropriate decisions based on them.

- تقوم أجهزة الاستشعار بتحويل التغيرات إلى إشارات لتتمكن الآلات والأجهزة من فهمها واتخاذ القرارات المناسبة.

- Sensors have working steps :

- خطوات عمل أجهزة الاستشعار :

1. Transmission الإرسال   2. Signal conversion تحويل الإشارات   3. sensing الاستشعار

- There're many types of sensors used in robots such as :

- هناك العديد من أنواع أجهزة الاستشعار مثل :

- Distance sensors استشعار المسافة
- Special sensors أجهزه استشعار خاصة
- Motion sensors استشعار الحركة
- Sound sensors استشعار الصوت
- Light sensors استشعار الضوء

- Sensors are used in smartphones, cars, smart homes, and games to provide features as voice recognition, remote control, and location.

- تستخدم أجهزه الإستشعار فى الهواتف الذكية، السيارات، المنازل الذكية والألعاب لتوفير مميزات مثل التعرف على الصوت والتحكم عن بعد، وتحديد الموقع.



How to deal with the exam

كلمات و عبارات إسترشادية تساعدك على حل أسئلة الامتحان.

Topic	Guiding words	Exam items
Sensors	sensors	Sensors are devices that sense changes in the surrounding environment.
	signal conversion - electrical signals	Signal conversion converts this information into electrical signals.
	distance sensors - robot	Distance sensors measure the distance between the robot and the obstacles around it.
	surgical robots	Surgical robots use accurate sensors to perform surgeries.
	ultrasonic sensors	Ultrasonic sensors emit high-frequency sound waves.
	laser sensors - beam	Laser sensors emit a laser beam it.
	non-contact - thermometers	Non-contact thermometers used to measure the temperature without the need for direct contact.

General Exercises





▸ If you got 🔴 you need to revise the lesson again.

🔵 ممتاز 🟢 جيد جدا 🟡 جيد 🔴 غير جيد

قم بتقييم نفسك بالعلامات الموضحة وإذا حصلت على 🔴 [غير جيد] قم بمراجعة الدرس مرة أخرى من الصفحة السابقة.

El-Moasser Exercises

1 Choose the correct answer from a, b, c or d.

1. Sensors are ....
   a. devices used to decorate robots.
   b. devices that sense changes in the environment and convert them into signals.
   c. devices used to operate electrical appliances.
   d. devices used to store data.
2. In robots, sensors help to ....
   a. powering robots
   b. give robots mobility
   c. enable robots to understand and interact with their environment
   d. store information collected by the robot
3. .... is **not** an example of a sensor.
   a. Temperature sensor
   b. Light sensor
   c. Electric motor
   d. Sound sensor
4. .... is the first step in the work of the sensor.
   a. Sending signals to another device
   b. Converting signals into electrical signals
   c. Making a decision based on the sensed information
   d. Sensing changes in the environment
5. Ultrasonic sensors are used in vacuum cleaner robots for ....
   a. determining the color of objects
   b. measuring room temperature
   c. determining the distance between the robot and obstacles
   d. controling the suction power

2 Complete the following sentences with the appropriate words in brackets.

(Sensors - Signal conversion - Sensor - Ultrasonic sensor - Distance Sensor)

1. A device that translates sensations such as heat, light, and sound into a language that a computer understands is ....

2. A type of devices that use sound waves to measure the distance to objects is ....
3. The process through which a sensor converts sensing information into electrical signals is the .... step.
4. .... are considered the eyes and ears of machines.
5. .... measure the distance between the robot and surrounding obstacles.

3 Put (✓) in front of the correct sentence and (x) in front of the wrong one.

1. Light sensors measure the distance between the robot and the obstacles around it. ( )
2. Motion sensors help the robot navigate and interact with surrounding objects. ( )
3. A self-driving car is an example of an electronic device in which sensors are used. ( )
4. Ultrasonic sensors emit low-frequency sound waves and then receive the return waves after bouncing off an object. ( )
5. Vacuum cleaner robots use sensors to locate furniture without colliding. ( )

Student's Book Exercises

- **Choose the correct answer from a, b, c or d.**

1. The main function of the sensor is ....
   a. store data
   b. capture environmental changes and convert them into signals
   c. display images
   d. produce sound
2. Sensors help robots to ....
   a. teach them new languages
   b. allow them to interact with their environmen
   c. increase their size
   d. slow down their operations
3. .... is a type of sensors used to avoid obstacles.
   a. Light sensors
   b. Sound sensors
   c. Distance sensors
   d. Heat sensors
4. The first step in the operation of the sensor is ....
   a. transmission
   b. displaying
   c. sensing
   d. signal conversio
5. .... are commonly used in remote controls.
   a. Ultrasonic sensors
   b. Infrared sensors
   c. Light sensors
   d. Motion sensors

6. Laser rangefinders are accurate because they use ....
   a. sound waves
   b. visible light
   c. high frequency waves
   d. laser beams
7. A common application of sensors is the use of infrared in ....
   a. smartphones
   b. remote controls
   c. vacuum cleaners
   d. 3D scanning
8. In which environment are light sensors useful ? ....
   a. In dark rooms
   b. In places with variable lighting conditions
   c. In underwater environments
   d. In noisy factories
9. One of the sensors that are used to measure distance using high frequency sound waves is ....
   a. ultrasonic sensors
   b. laser rangefinders
   c. infrared sensors
   d. motion sensors
10. .... sensors are used to turn on lights when someone enters the room.
   a. Smartphone
   b. Smart car
   c. Smart Home Lighting System
   d. Smart watch
11. .... is used for non-contact temperature measurement.
   a. Ultrasonic sensor
   b. Infrared sensor
   c. Light sensor
   d. Motion sensor
12. .... is the main purpose of the signal conversion step in sensors.
   a. Display the results
   b. Send the signals to another device
   c. Convert the information into electrical signals
   d. Turn off the sensor
13. .... helps cars determine the distance to other vehicles.
   a. Sound sensors
   b. Light sensors
   c. Infrared sensors
   d. Distance sensors
14. .... is the practical use of motion sensors in games.
   a. Change the volume
   b. Adjust the brightness of the screen
   c. Track the movements of players
   d. Improve the sound quality
15. Factors that determine the choice of a sensor for a particular application ....
   a. Brand of the device
   b. Color of the device
   c. Environment and required accuracy
   d. Size of the device





Revision

on Lessons 1 & 2

مراجعة عامة على الدرسين الأول والثانى فى ورقة واحدة



Lesson 1 : Artificial Intelligence Applications

1

Types of artificial intelligence

- **Narrow AI:** Specializes in performing a specific task such as face recognition or language translation.
- **General AI:** More advanced, it can perform all human tasks such as thinking and problem solving.
- **Super AI:** The most advanced, outperforming humans in solving problems and discovering new things.

2

Fields of Artificial Intelligence:

- Natural Language Processing, Computer Vision, Robotics, Systems, Expert, Deep Learning

Artificial Intelligence Applications

- From the applications of artificial intelligence in daily life: personal assistant, smart games, smart cars, digital doctors, instant translator, smart shopping.

Lesson 2 : Sensors

1

Sensors

It is the most important concept in the world of modern technology, as it enables devices to understand the environment around them and interact with it intelligently and serves as the senses of machines.

The importance of sensors

- **For robots:** enable them to interact with their environment.
- **In electronic devices:** used in smartphones, cars.

2

Types of sensors

- **Distance sensors:** measure the distance to objects (such as ultrasonic sensors and laser rangefinders).
- **Light sensors:** Senses the intensity of light (such as digital cameras).
- **Sound sensors:** Convert sound waves into electrical signals.
- **Motion sensors:** detect motion and changes in direction.

Accumulative Test

On Lessons 1&2



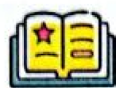
اختبار تراكمى على الدرسين الأول والثانى

1 Choose the correct answer from a, b, c or d.

1. .... are types of artificial intelligence.
   a. Narrow AI
   b. Super Artificial Intelligence
   c. Both (a) and (b)
   d. Low artificial intelligence
2. .... is one of the factors that control the choice of a sensor for a particular application.
   a. Device brand
   b. Device color
   c. Environment and accuracy required
   d. Device size
3. Which of the following is an application of sensors? ....
   a. Home security systems
   b. Wearable medical devices
   c. Video games
   d. All of them
4. The primary function of the sensor is ....
   a. View data
   b. Capture environmental changes and convert them into signals
   c. View information
   d. Video Production
5. .... is the primary goal of deep learning.
   a. Perform specific tasks without learning
   b. Simulation of human learning via neural networks
   c. Perform calculations only
   d. Translation of written texts

2 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. In modern cars, sensors are used to determine speed, warn of collisions, and help the driver for parking. ( )
2. Understanding voice commands is one of the roles played by personal assistants such as Siri and Alexa. ( )
3. Vacuum cleaner robots cannot accurately locate furniture and obstacles. ( )
4. AI cannot be used in developing games. ( )
5. Self-driving cars do not rely on artificial intelligence. ( )
6. Robots can do a lot of work with high accuracy. ( )



يمكنك المراجعة باستمرار (تراكمية)
من خلال الصفحة السابقة.



Robots



Learn

- The world is full of amazing robots that can do incredible things.

لقد أصبح العالم مليئًا بأنواع مختلفة من الروبوتات المدهشة التي تستطيع فعل أشياء لا تصدق.

- Robots can help us in our daily lives and in various fields.

الروبوتات يمكنها مساعدتنا في حياتنا اليومية وفي مختلف المجالات.

- **A robot can**
  - clean your room. يمكن للروبوت تنظيف غرفتك.
  - help you with your daily tasks. يستطيع الروبوت مساعدتك في المهام اليومية.

- Small robots → can run and play with you like a pet.

يمكن للروبوت الصغير أن يركض ويلعب معك مثل الحيوان الأليف.

Definition of Robot تعريف الروبوت

A robot

- is a device that can be programmed to perform a set of specific tasks automatically.
  الروبوت هو جهاز يمكن برمجته لأداء مجموعة من المهام بشكل أوتوماتيكي.
- can move, sense (via sensors), and interact with its surroundings.
  يستطيع الروبوت التحرك والإحساس (عن طريق المستشعرات) والتفاعل مع محيطه.
- can be used in environments that require precision and speed of performances.
  يمكن استخدام الروبوت في بيئات تتطلب دقة وسرعة في الأداء.

various fields	مختلف المجالات	device	جهاز	precision	دقة
tasks	مهام	interact with	يتعامل مع	speed	سرعة



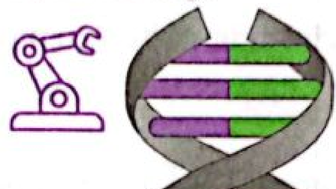
Example

. When you see a vacuum cleaner moving by itself in the house to clean the floor, this is a type of robot that works independently.

فعندما ترى مكنسة كهربائية تتحرك وحدها فى المنزل لتنظيف الأرض ، فهذا نوع من الروبوتات التى تعمل بشكل مستقل.

1 Types of Robots أنواع الروبوتات

- There are several types of robots, including: هناك عدة أنواع للروبوتات منها :






- Industrial robots الروبوتات الصناعية
- Medical robots الروبوتات الطبية
- Educational robots الروبوتات التعليمية
- Home robots الروبوتات المنزلية

Industrial robots : الروبوتات الصناعية

Industrial robots
- are used in factories. هى روبوتات تستخدم فى المصانع .
- perform work with high accuracy. تستطيع الروبوتات الصناعية أداء الأعمال بدقة عالية .



Such as : robots that work in car production plants on production lines quickly and accurately. مثل الروبوتات التى تعمل فى مصانع إنتاج السيارات فى خطوط الإنتاج بسرعة ودقة .

Home robots : الروبوتات المنزلية

Home robots
- are found in homes. هذه الروبوتات توجد فى المنازل .
- are cleaning robots. هى روبوتات للتنظيف .



Such as : Roomba is a cleaning robot that helps clean floors without any human effort, such as smart vacuums.

مثل "Roomba" إحدى روبوتات التنظيف التى تساعد فى تنظيف الأرضيات بدون أى جهد بشرى مثل المكانس الذكية.

Vacuum cleaner	مكنسة كهربائية	industrial	صناعى	plants	مصانع
independently	بشكل مستقل	accurately	بدقة		

Medical robots : الروبوتات الطبية



Medical robots help doctors perform surgeries, and they can be very accurate.

الروبوتات الطبية تساعد الأطباء فى إجراء الجراحات، ويمكنها أن تكون دقيقة جدًا.

Educational robots : الروبوتات التعليمية

These robots are used in schools to teach students how to program and technology.

هذه الروبوتات تُستخدم فى المدارس لتعليم الطلاب كيفية البرمجة والتكنولوجيا.

Such as: LEGO Mindstorms robots that can be programmed to perform specific tasks to :

مثل روبوتات "LEGO Mindstorms" التى يمكن برمجتها للقيام بمهام محددة.



help students
لمساعدة الطلاب



be an aid to the teacher
لتكون معينا للمعلم



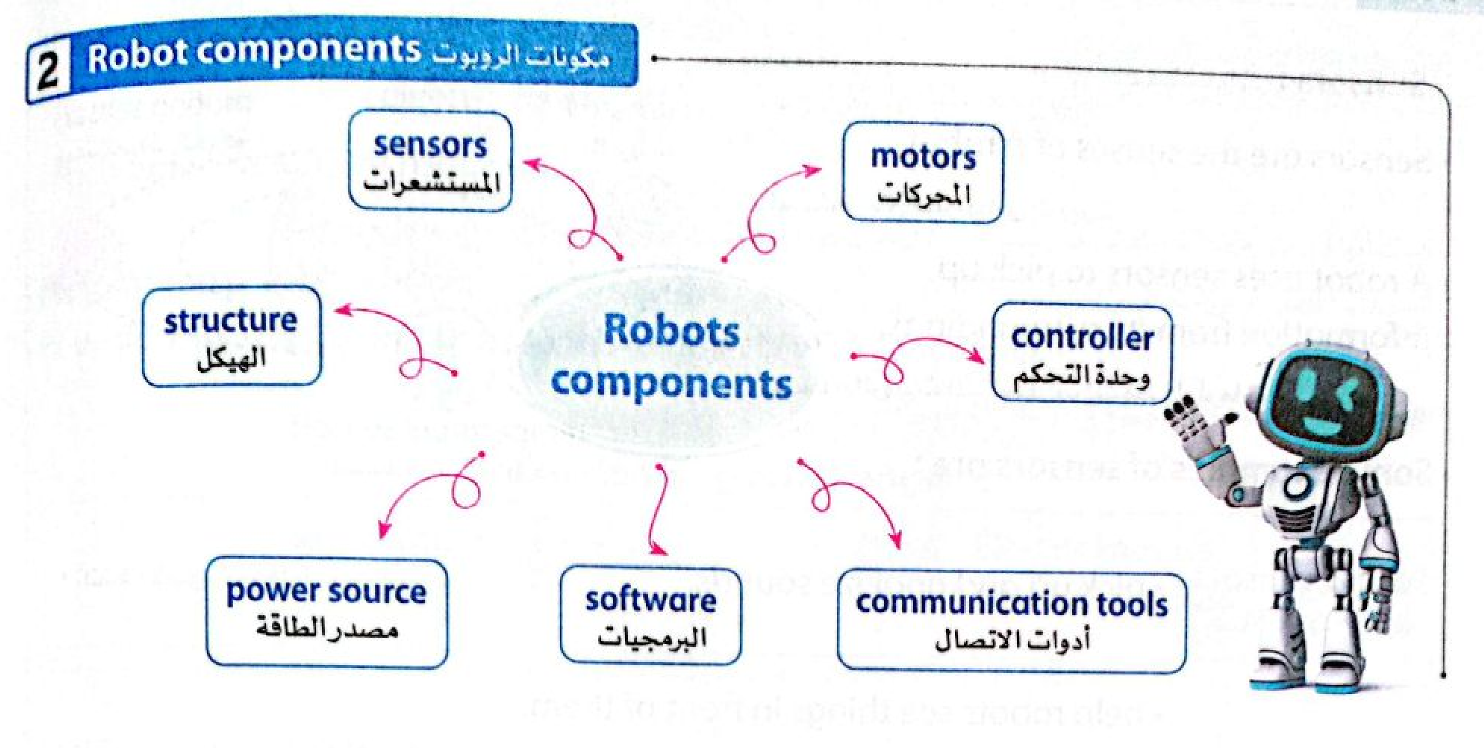


Choose the correct answer from a, b, c or d :

1. .... robots are used in factories.
   a. Home b. Industrial c. Medical d. Educational
2. Robots can be .... to perform specific tasks.
   a. deleted b. printed c. programmed d. disconnected
3. .... robots are programmed to be an aid to the teacher.
   a. LEGO Mindstorms b. Roomba
   c. Home d. Industrial

medical طبى | educational تعليمى

2 Robot components مكونات الروبوت



Structure : الهيكل

The structure
- is the main part of the robot. الهيكل هو الجزء الأساسي من الروبوت.
- carries the components of the robot. الهيكل يحمل جميع مكونات الروبوت.

• It can be made of different materials such as:

metal | plastic | carbon

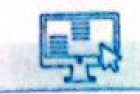
يمكن أن يكون الهيكل مصنوعًا من مواد مختلفة مثل المعدن، البلاستيك أو الكربون.

• The design of the structure affects : تصميم الهيكل يؤثر على :

- the weight of the robot
  وزن الروبوت
- its ability to move
  قدرته على الحركة

design تصميم | weight وزن





Lesson Three

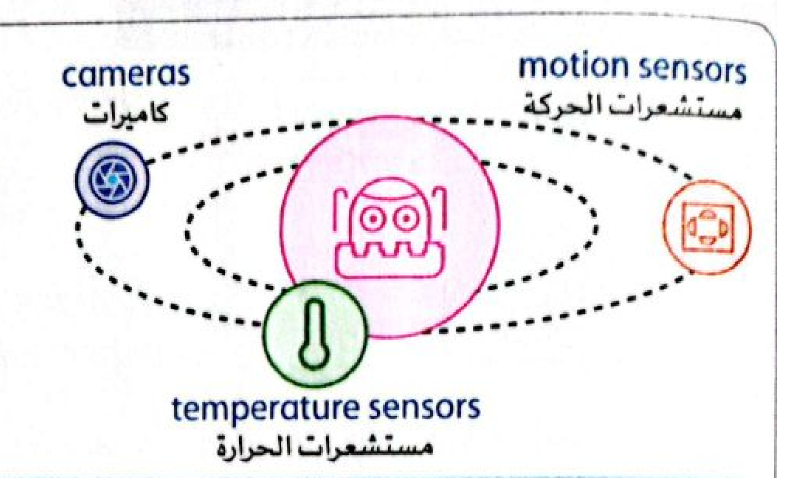
Sensors : المستشعرات

- Sensors are the senses of a robot.

المستشعرات تعتبر حواس الروبوت.

- A robot uses sensors to pick up information from its surroundings.

يستخدم الروبوت المستشعرات ليلتقط المعلومات من حوله.



- Some examples of sensors are :

Sound sensors مستشعرات الصوت	• pick up and analyze sounds.	• تلتقط الأصوات وتحللها.
Cameras الكاميرات	• help robots see things in front of them. • capture visual data for navigation and recognition	• تساعد الروبوتات فى رؤية الأشياء أمامها. • تلتقط البيانات البصرية للتنقل والتعرف.
Temperature sensors مستشعرات الحرارة	• detect temperature levels in the environment.	• تكتشف مستويات الحرارة فى البيئة.
Motion sensors مستشعرات الحركة	• determine movement and location changes.	• تحدد الحركة وتغيرات الموقع.

Motors : المحركات

Motors
- are used to move parts of a robot. — تستخدم المحركات لتحريك أجزاء الروبوت.
- are the industrial muscles of robots. — المحركات هى العضلات الصناعية للروبوتات.

- Thanks to motors (actuators), robots can → move and execute commands.

بفضل المحركات (المشغلات)، يمكن للروبوتات أن تتحرك وتنفذ الأوامر.

analyze	يحلل	navigation	تنقل	location changes	تغيرات المناخ	visual	بصرى

• There are different types of motors such as:

• electric motors • pneumatic motors

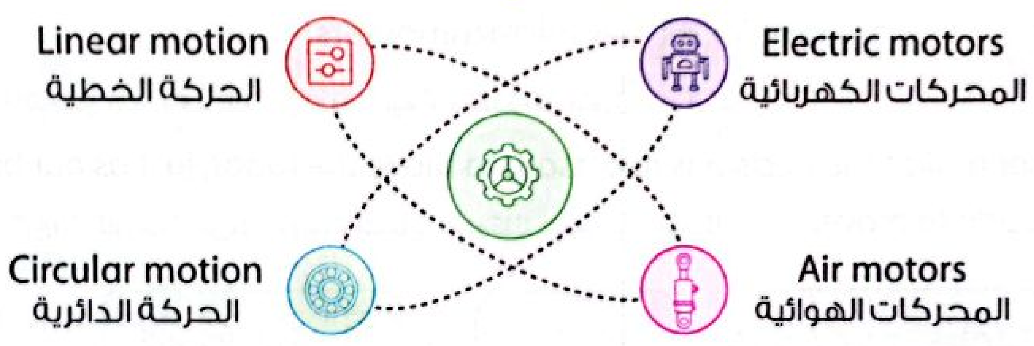
• Each type has its own uses.

هناك أنواع مختلفة من المحركات ، مثل المحركات الكهربائية و المحركات الهوائية وكل منها له استخداماته الخاصة.

• **Motors :** make robots move. **المحركات** : تجعل الروبوتات تتحرك.

• **Robotic arm:** used in factories to move objects with precision.

الذراع الآلية: تستخدم فى المصانع لتحريك الأشياء بدقة.





▸ **Put (✓) in front of the correct sentence and (✗) in front of the wrong one :**

1. Structures are the senses of robots. ( )
2. The structures of the robot can be made of metal, plastic or carbon. ( )
3. Motion sensors pick up and analyze sounds. ( )
4. Sensors are the industrial muscles of robots. ( )

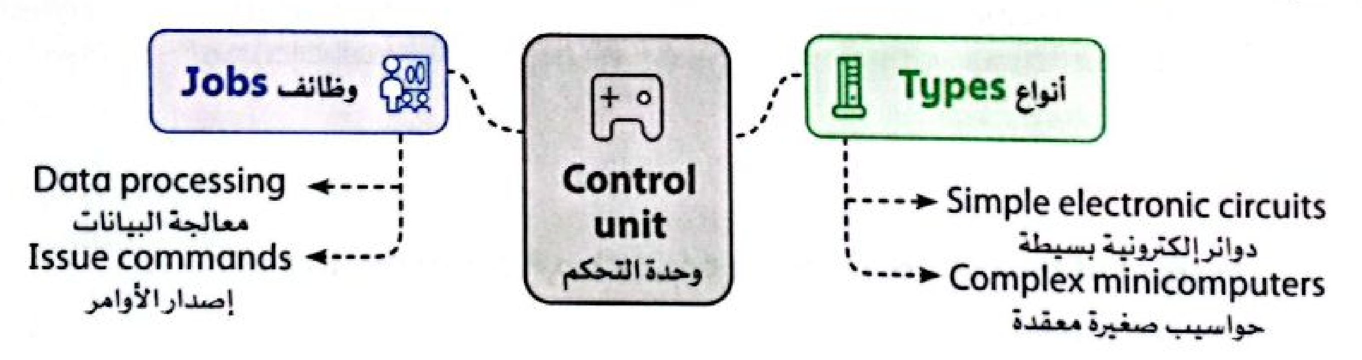
Controller : وحدة التحكم

Controller is
- the "brain" of the robot. وحدة التحكم هى «عقل» الروبوت.
- processing the data collected by the sensors. وحدة التحكم تعالج البيانات التى تجمعها المستشعرات.
- issuing commands to the motors. وحدة التحكم تصدر الأوامر للمحركات .

The controller can be
- as simple as → electronic circuits.
- as complex as → microcomputers

يمكن أن تكون وحدة التحكم بسيطة مثل الدوائر الإلكترونية أو معقدة مثل الحواسيب الصغيرة.

▶ The processor makes the decisions necessary to move the robot, just as our brain thinks when we decide to move. يقوم المعالج باتخاذ القرارات اللازمة لتحريك الروبوت مثلما يفعل عقلنا عندما نقرر التحرك.



Power Source : مصدر الطاقة

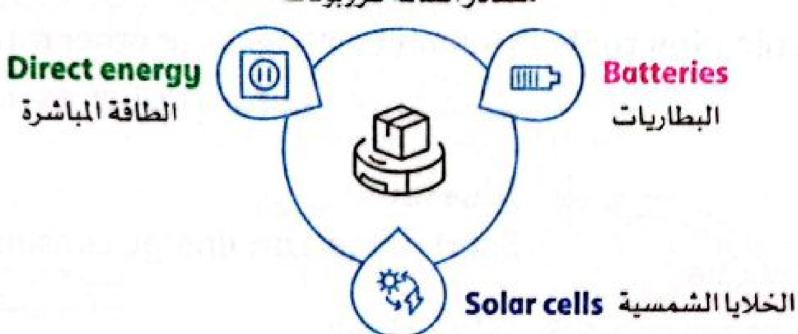
▶ Robots need a power source to operate. تحتاج الروبوتات إلى مصدر طاقة لتشغيلها.

Power sources can be : يمكن أن تكون مصادر الطاقة

Batteries	Portable energy storage for motion. البطاريات : تخزين الطاقة المحمولة للحركة .
Solar cells	Sustainable renewable energy source.. الخلايا الشمسية : مصدر الطاقة المتجددة المستدامة.
Direct electrical power source (direct energy)	continuous power supply for extended use. مصادر طاقة كهربائية مباشرة (الطاقة المباشرة) : إمداد الطاقة المستمر للاستخدام الممتد.

issue commands إصدار الأوامر complex معقد electronic circuits دوائر الكترونية

Energy sources for robots
مصادر الطاقة للروبوتات



The choice of power source depends on
اختيار مصدر الطاقة يعتمد على

- The type of robot
  نوع الروبوت
- The required operating time
  مدة تشغيله المطلوبة

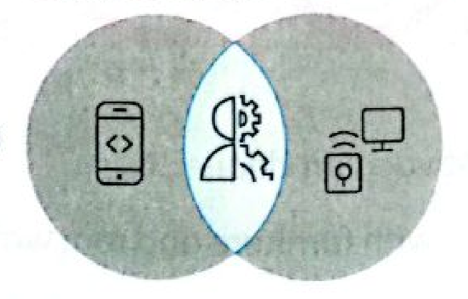
Software : البرمجيات

- Software is what makes a robot "smart."
  البرمجيات هى ما يجعل الروبوت «ذكياً».
- Software includes **algorithms**
  that determine how the robot responds to information it receives from sensors.
  تتضمن البرمجيات الخوارزميات التى تحدد كيفية استجابة الروبوت للمعلومات التى يتلقاها من المستشعرات.
- Software can range from **simple programs to**
  Complex artificial intelligence systems
  يمكن أن تتراوح البرمجيات من برامج بسيطة إلى أنظمة ذكاء اصطناعى معقدة.

Integrating software and sensors into robots
دمج البرمجيات والمستشعرات فى الروبوتات

Smart response استجابة ذكية

Software البرمجيات

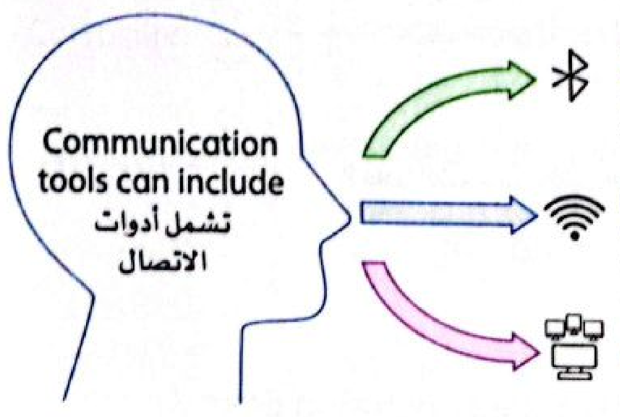


Sensors المستشعرات

Communication tools : أدوات الاتصال

• Robots use **communication tools** to interact with users or other robots.

تستخدم الروبوتات أدوات الاتصال للتفاعل مع المستخدمين أو روبوتات أخرى.



Bluetooth بلوتوث
Short range, Low energy consumption
نطاق قصير، استهلاك منخفض للطاقة

Wi-fi الواي فاي
Long range, high data transfer rate
نطاق طويل، معدل نقل بيانات عالي

Other techniques تقنيات أخرى
(Other communication technologies) Depending on specific requirements اعتمادًا على المتطلبات المحددة

• This diagram shows you brief summary for the components of robots.

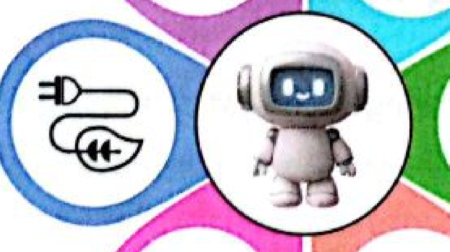
Components of Robot Operation

Software
Provides the necessary instructions and operations



Structure
Provides the framework and structural support for the robot

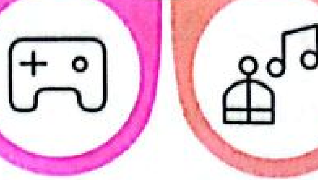
Power Sources
Supplies the necessary energy for all components





Actuators
Enable movement by providing kinetic energy

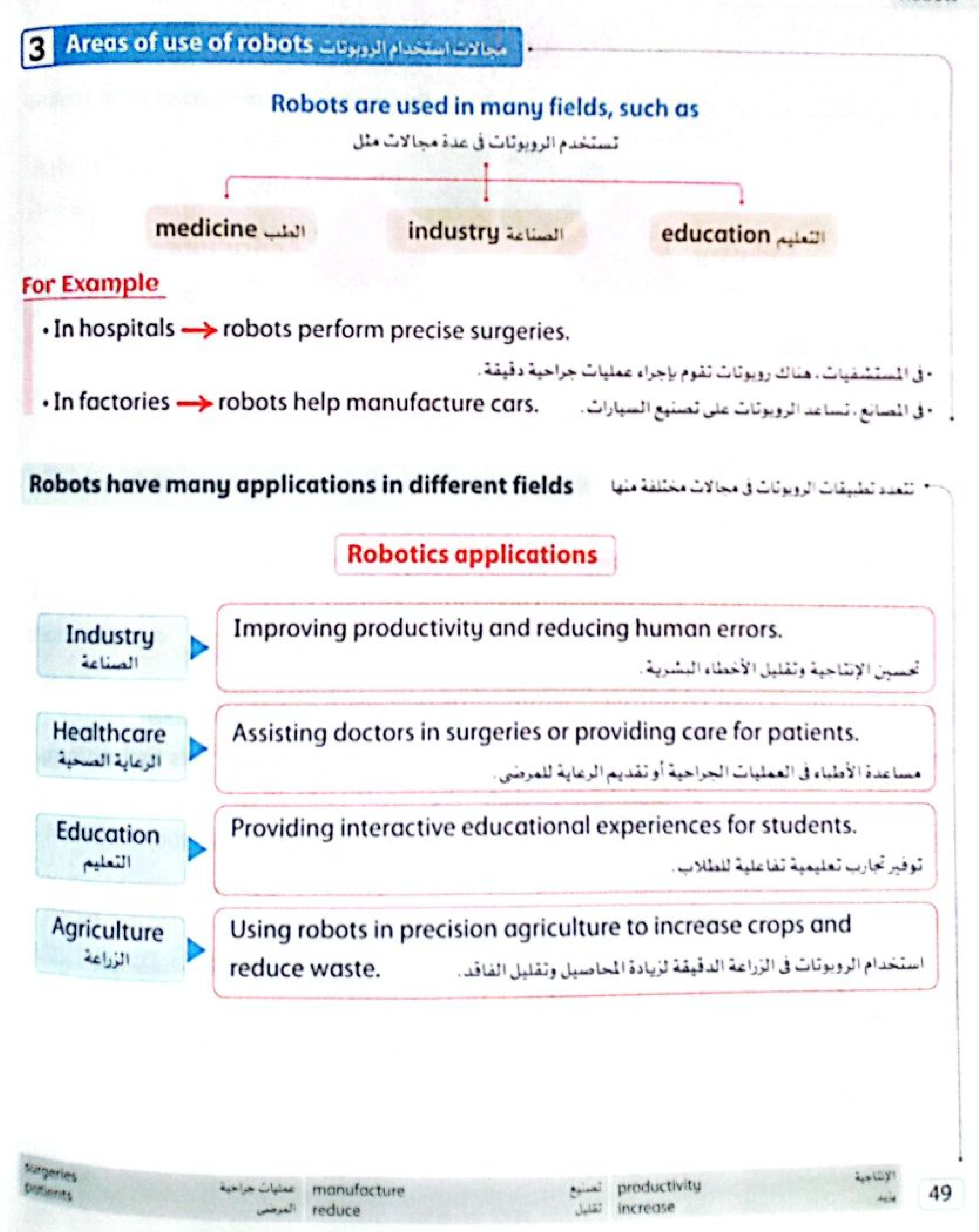
Control Unit
Acts as the brain, coordinating various functions



Sensors
Collect environmental data for interaction and response

• A home robot, such as a robot vacuum cleaner, has **sensors** to avoid **collisions** with furniture and rom walls.

interact with	يتفاعل على	requirements	متطلبات	kinetic energy	طاقة حركية
necessary	ضروري	collision	اصطدام	framework	إطار هيكل



3 Areas of use of robots مجالات استخدام الروبوتات

Robots are used in many fields, such as

تستخدم الروبوتات في عدة مجالات مثل

- medicine الطب
- industry الصناعة
- education التعليم

For Example

- In hospitals → robots perform precise surgeries.

  • في المستشفيات، هناك روبوتات تقوم بإجراء عمليات جراحية دقيقة.

- In factories → robots help manufacture cars.

  • في المصانع، تساعد الروبوتات على تصنيع السيارات.

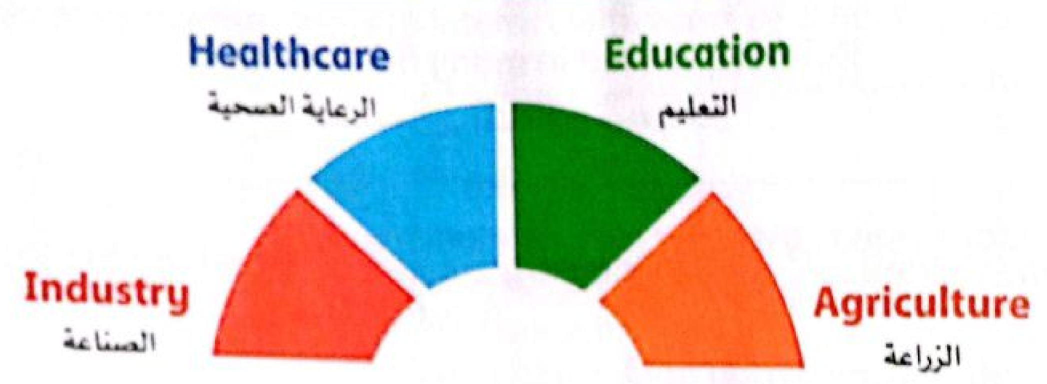
Robots have many applications in different fields • تتعدد تطبيقات الروبوتات في مجالات مختلفة منها

Robotics applications

Field	Application
Industry الصناعة	Improving productivity and reducing human errors. تحسين الإنتاجية وتقليل الأخطاء البشرية.
Healthcare الرعاية الصحية	Assisting doctors in surgeries or providing care for patients. مساعدة الأطباء في العمليات الجراحية أو تقديم الرعاية للمرضى.
Education التعليم	Providing interactive educational experiences for students. توفير تجارب تعليمية تفاعلية للطلاب.
Agriculture الزراعة	Using robots in precision agriculture to increase crops and reduce waste. استخدام الروبوتات في الزراعة الدقيقة لزيادة المحاصيل وتقليل الفاقد.

surgeries عمليات جراحية	manufacture تصنيع	productivity الإنتاجية
patients المرضى	reduce تقليل	increase يزيد

Robotics applications





▸ **Choose the correct answer from a, b, c or d.**

1. .... is the brain of the robot.
   a. Structure b. Controller c. Sensor d. Camera
2. .... are sustainable renewable energy source.
   a. Batteries b. Solar cells c. Algorithms d. Industry
3. Industry, healthcare, education and agriculture are robotics ....
   a. challenges b. components c. sources d. applications

4 Challenges facing robotics technology التحديات التي تواجه تكنولوجيا الروبوتات

Despite the many benefits of robotics, there are challenges facing this technology, such as:

على الرغم من الفوائد العديدة للروبوتات، إلا أن هناك عددًا من التحديات تواجه هذه التكنولوجيا، مثل:

Safety : The need to ensure the safety of robots during work.

الأمان: الحاجة إلى ضمان سلامة الروبوتات أثناء العمل.

Employment : Concern that robots may replace human labor.

التوظيف: القلق من أن الروبوتات قد تحل محل العمالة البشرية.

Ethics : Issues related to robots and their impact on society.

الأخلاقيات: القضايا المتعلقة بالروبوتات وتأثيرها على المجتمع.

human labor العمالة البشرية

5 Benefits of robots فوائد الروبوتات

Robots offer many benefits in various fields : تقدم الروبوتات العديد من الفوائد فى مجالات متعددة :

Robots help تساعد الروبوتات فى
- improve work efficiency . تحسين كفاءة العمل .
- reduce errors. تقليل الأخطاء.
- save time. توفير الوقت .

The most prominent benefits of robots : من أبرز فوائد الروبوتات

▸ Increased efficiency and productivity زيادة الكفاءة والإنتاجية

Industrial robots can work continuously without fatigue or interruption
الروبوتات الصناعية يمكنها العمل بشكل مستمر دون تعب أو انقطاع

↓

which increases the amount of production in factories and saves time.
مما يزيد من كمية الإنتاج فى المصانع ويوفر الوقت.

In production lines , robots can perform repetitive tasks **accurately** and **without delay**

which
- improves the quality of products.
- reduces errors.

فى خطوط الإنتاج ، تستطيع الروبوتات أداء المهام المتكررة بدقة وبدون أى تأخير ، مما يحسن جودة المنتجات ويقلل الأخطاء.

▸ High accuracy and reduced errors الدقة العالية وتقليل الأخطاء

- Medical robots are used in **complex surgeries,**

helping doctors
- **achieve greater accuracy.**
- **reduce the chances of human errors.**

تستخدم الروبوتات الطبية فى العمليات الجراحية المعقدة ، حيث تساعد الأطباء على تحقيق دقة أكبر وتقليل احتمالات حدوث أخطاء بشرية.

- **In the electronics industry :** robots assemble small parts with precision, **improving manufacturing accuracy** and **reducing losses due to defects.**

فى صناعة الإلكترونيات، تعمل الروبوتات على تركيب الأجزاء الصغيرة بحرفية ، مما يحسن دقة التصنيع ويقلل الخسائر الناتجة عنه العيوب .

benefits	فوائد	efficiency	كفاءة	errors	أخطاء	defects	عيوب
fatigue	تعب	repetitive	متكرر	assemble	يركب	interruption	انقطاع
delay	تأخير	losses	خسائر				

▶ Safety and security. السلامة والأمان.

Robots help in dangerous tasks such as dismantling bombs or working in hazardous environments

تساعد الروبوتات فى المهام الخطرة، مثل تفكيك القنابل أو العمل فى البيئات الخطرة،

⇩

which reduces the risk to human lives and makes these tasks safer.

هذا يقلل من تعريض حياة البشر للخطر ويجعل هذه المهام أكثر أماناً.

- In factories ,robots can handle **heavy weights and hazardous chemicals** ,reducing the chances of worker injury.

في المصانع، يمكن للروبوتات التعامل مع الأوزان الثقيلة والمواد الكيميائية الخطرة، مما يقلل من احتمالات إصابة العمال.

▶ Adaptability to diverse work التكيف مع العمل المتنوع

- Robots can be programmed to perform various tasks as needed ,making them capable of performing different jobs efficiently .For example ,home robots can clean or entertain.

يمكن برمجة الروبوتات لتنفيذ مهام متنوعة حسب الحاجة، مما يجعلها قادرة على أداء أعمال مختلفة بكفاءة. على سبيل المثال، الروبوتات المنزلية يمكنها القيام بالتنظيف أو الترفيه.

In the field of education, robots help students learn programming and science in interactive ways to help students and teachers.

فى مجال التعليم، تساعد الروبوتات الطلاب على تعلم البرمجة والعلوم بطرق تفاعلية لمساعدة الطلاب والمعلمين.

▶ Reduce costs in the long run تقليل التكلفة على المدى الطويل

- Although the cost of manufacturing and installing robots may be high, robots reduce costs in the long run by:

reducing the need for human labor	achieving greater accuracy	reducing errors and waste

على الرغم من أن تكلفة تصنيع وتركيب الروبوتات قد تكون مرتفعة، فإن الروبوتات تقلل التكاليف على المدى الطويل من خلال تقليل الحاجة إلى العمالة البشرية، وتحقيق دقة أكبر، وتقليل نسبة الأخطاء والهدر.

capable of	قادرة على	cost	تكلفة
efficiently	بكفاءة	hazardous chemicals	المواد الكيميائية الخطيرة

Contributing to development المساهمة فى التطور

- Robots encourage technological development and open new horizons in many fields such as space ,where robots are used to explore planets.

تشجع الروبوتات على التطوير التكنولوجى وفتح آفاق جديدة فى مجالات عديدة مثل الفضاء، حيث تُستخدم الروبوتات فى استكشاف الكواكب.

In the field of medicine, robots contribute to advanced medical research and the development of new treatments.

فى مجال الطب، تساهم الروبوتات فى الأبحاث الطبية المتقدمة وتطوير علاجات جديدة.

Activities

Dear student ,with the help of your teacher and in cooperation with your colleagues, you can do some of the following activities :

عزيزى الطالب بمساعدة معلمك وبالتعاون مع زملائك يمكنك القيام ببعض الأنشطة التالية :

- Through the Internet, search for a picture of a robotic vacuum cleaner, discuss with your colleagues how it works using sensors.

من خلال الإنترنت ابحث عن صورة لمكنسة روبوتية، ناقش مع زملائك كيفية عملها باستخدام المستشعرات.

- Search for pictures of types of robots, try with your colleagues to classify them according to use (domestic, industrial, medical, exploratory).

ابحث عن صور لأنواع الروبوتات، حاول مع زملائك تصنيفها حسب الاستخدام (منزلى، صناعى، طبى أو استكشافى).

- Think of a robot that helps you and your colleagues in your daily lives, describe how this robot can work.

• فكر فى شكل روبوت يساعدك انت وزملائك فى حياتكم اليومية، أوصف كيف يمكن لهذا الروبوت أن يعمل.

- Draw a robot on a piece of paper for you to use at home, identifying the three parts: motors, sensors, and processor.

ارسم روبوت على ورقة لكى تستخدمه فى المنزل، مع تحديد الأجزاء الثلاثة : المحركات، وأجهزة الاستشعار، والمعالج.

- Draw an idea for a robot that you wish to own or manufacture in the future, and write a short description of its function.

ارسم فكرة لروبوت تتمنى أن تمتلكه أو يتم تصنيعه فى المستقبل، مع كتابة وصف قصير عن وظيفته.

Stop here !





استمع إلى
ملخص الدرس

نقاط هامة وعبارات استرشادية تمكنك من تلخيص وإتقان الدرس.

Lesson Summary

- Types of robots are industrial, household, medical, and educational.

– أنواع الروبوتات هى الروبوتات الصناعية، المنزلية، الطبية، والتعليمية.

- **Structure** is the main part of robots that holds all the robot components.

– الهيكل هو الجزء الأساسى فى الروبوت الذى يحمل جميع مكونات الروبوت.

- **Motors:** move the parts of the robot. Motors include electric motors and pneumatic motors.

المحركات: تحرك أجزاء الروبوت ومنها محركات كهربائية ومحركات هوائية.

- **Controller** receives data from sensors, analyzes them, and issues commands to engines.

• تستقبل وحدة التحكم البيانات من المستشعرات، وتحللها، وتصدر الأوامر للمحركات.

- **Power Source:** provides the power needed to power all the components of the robot.

• مصدر الطاقة يوفر الطاقة اللازمة لتشغيل جميع مكونات الروبوت.

- **Power Source :** can be a battery, solar cells, or an external power source.

• مصدر الطاقة يمكن أن يكون بطارية، خلايا شمسية، أو مصدر طاقة خارجى.

- Robots use communication tools to interact with users or with other robots.

• تستخدم الروبوتات أدوات الاتصال للتفاعل مع المستخدمين أو مع روبوتات أخرى.



How to deal with the exam

كلمات و عبارات إسترشادية تساعدك على حل أسئلة الامتحان.

Topic	Guiding words	Exam items
Robots	robot	A robot is a device that can be programmed to perform a set of specific tasks automatically.
	medical - perform surgeries	Medical robots help doctors perform surgeries, and can be very precise.
	sensors - capture information.	Sensors are the robot's senses and are used by the robot to capture information.
	Motors – artificial	Motors are the artificial muscles of robots.
	Software- algorithms	Software includes algorithms that determine how the robot responds to information it receives from sensors.

General Exercises









▸ If you got 🔴 you need to revise the lesson again.

ممتاز 🔵 جيد جدا 🟢 جيد 🟡 غير جيد 🔴

قم بتقييم نفسك بالعلامات الموضحة وإذا حصلت على 🔴 (غير جيد) قم بمراجعة الدرس مرة أخرى من الصفحة السابقة.

El-Moasser Exercises

1 Choose the correct answer from a, b, c or d.

1. .... include algorithms that determine how the robot responds to information it receives from sensors.
   a. Structures b. Software
   c. Engines d. Communication tools
2. Communication tools include................ .
   a. Bluetooth b. Wi-Fi
   c. both a & b d. none of them
3. .... are components of the robot.
   a. Structure b. Software
   c. Motors d. All of them
4. One of the areas of use of robots in .... is to provide interactive experiences for students.
   a. industry b. health care
   c. education d. agriculture
5. The challenges of robotics technology are ....
   a. security b. employment
   c. ethics d. all of them

2 Complete the following sentences with the appropriate words in brackets.

(Motors – controller – software – robot – Educational)

1. A .... is a device that can be programmed to perform a set of specific tasks automatically.
2. .... robots are used in schools to teach students.
3. .... are used to move parts of a robot.
4. The .... is the brain of the robot.

3 Put (✓) in front of the correct sentence and (x) in front of the wrong one.

1. A robot is a device that cannot be programmed to perform tasks automatically. ( )
2. Medical robots are used in schools to teach students how to code. ( )
3. The structure is the main part that holds all the components of the robot. ( )
4. Sensors are the senses of the robot. ( )
5. Robots can rely on solar cells as a source of energy. ( )
6. The structure is what makes the robot smart. ( )
7. Robots use communication tools to interact with users. ( )
8. The robot vacuum cleaner has sensors to avoid collisions with furniture. ( )
9. Robots cannot perform precise surgeries. ( )
10. Care and health are areas of robot use. ( )

Student's Book Exercises

1 Put (✓) in front of the correct sentence and (x) in front of the wrong one.

1. Sensors do not play a role in the movement of robots and sensing their surrounding environment. ( )
2. Robots work is limited to factories only. ( )
3. Medical robots help doctors perform surgeries. ( )
4. The design of the structure affects the weight of the robot and its ability to move. ( )
5. Vision sensors are used to capture sounds. ( )
6. The motors used in robots include electric motors and air motors. ( )
7. The control unit processes the data collected by the sensors and issues commands to the motors. ( )
8. Robots rely on direct energy sources only and we cannot use batteries or solar cells. ( )
9. Robots do not need to use software in their work. ( )
10. Robots use communication tools to interact with users or other robots. ( )
11. The areas of use of robots include industry, healthcare, and education. ( )

2 Choose the correct answer from a, b, c or d.

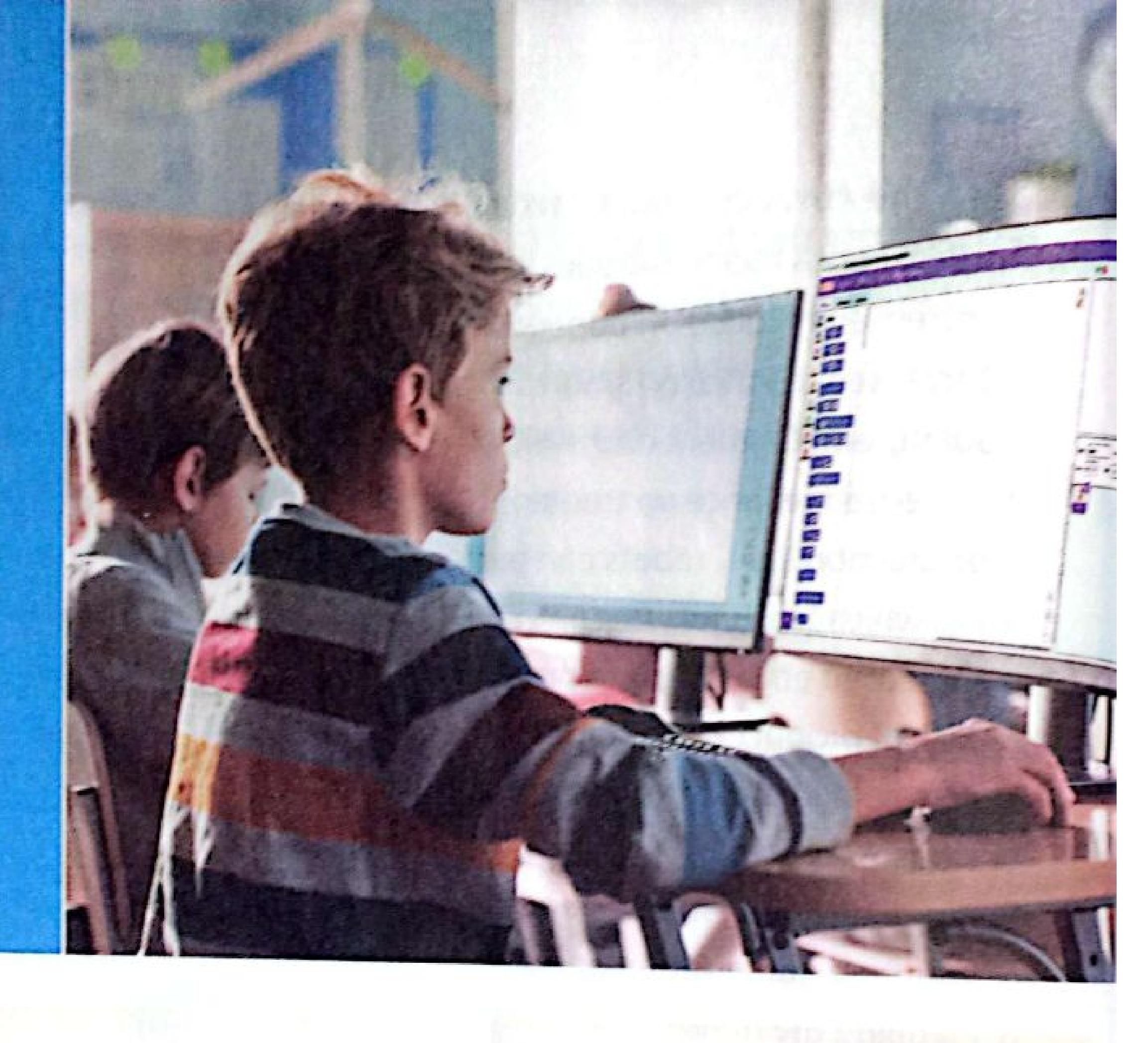
1. The challenges facing robotics technology include................
   a. Increased reliance on paper documents.
   b. Increased reliance on smartphones.
   c. Safety, employment and ethics.
   d. Increased reliance on traditional machines.
2. In production lines, robots can perform repetitive tasks accurately and without any delay, which leads to ....
   a. Increased efficiency and productivity.
   b. Decreased efficiency and productivity.
   c. Lack of product development.
   d. Slow production process.
3. Robots help in dangerous tasks such as ....
   a. Transportation.
   b. Handling heavy weights and hazardous chemicals.
   c. Irrigating gardens and parks.
   d. Cleaning the house
4. To take pictures and videos, we use .... sensors.
   a. Sound b. Touch c. Light d. Vision



قم بتلوين الدائرة باللون المناسب لمستواك.



Scratch

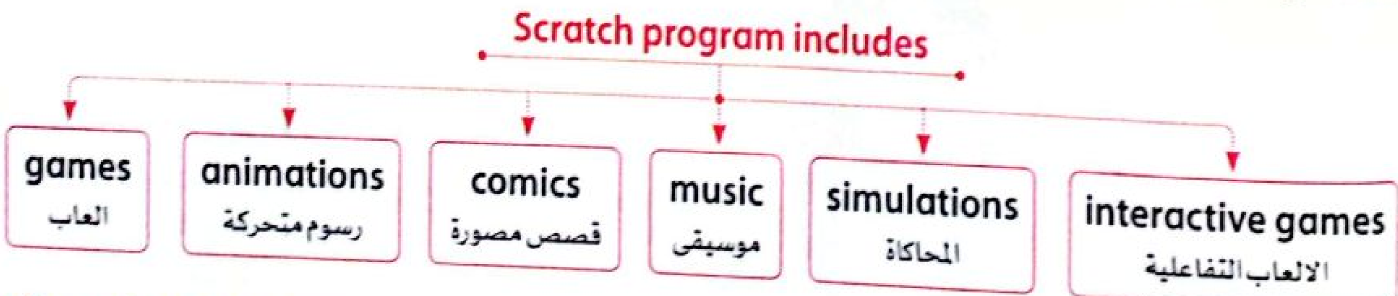


Learn



▸ **Scratch program :** It provides a very wide range of ideas that can be programmed that help the students to learn the principals of programming.

- يوفر برنامج سكراتش خيارات واسعة جدا من الأفكار التي يمكن برمجتها، والتي يتعلم فيها الطالب مبادئ البرمجة.



▸ **Scratch program** ▸ allow students to be creative while learning through :

يسمح برنامج سكراتش للاطفال ان يكونوا مبدعين اثناء التعلم من خلال :

- They feel as if they play a fun game while learning.

- يشعرون انهم كما لو كانوا يلعبون لعبة ممتعة اثناء تعلمهم.



provide	يمد - يوفر	games	العاب	simulation	محاكاة
wide	واسع	comics	قصص مصورة	interactive	تفاعلي
principals	مبادئ				

- It's fun and easy-to-use educational tool that allow learning the basics of programming in a visual and enjoyable way without the need to write a lot of complex codes.

- انه اداة تعليمية ممتعة وسهلة الاستخدام تتيح تعلم اساسيات البرمجة بطريقة مرئية وممتعة دون الحاجة الى كتابة الكثيرمن الاكواد المعقدة.

Scratch program features : مميزات برنامج Scratch :

Simple interface واجهة بسيطة	- Scratch use a visual interface based on blocks (bricks or commands). - يستخدم برنامج سكراتش واجهة مرئية تعتمد على (اللبنات او الاوامر). - The blocks are placed on top of each other in specific system and order to form programs. - هذه اللبنات توضع فوق بعضها البعض بنظام وترتيب معين لتكوين البرامج.
Educational program برنامج تعليم	Scratch is specially designed to teach basic programming concepts in a fun and exciting way. صُمم سكراتش خصيصا لتعليم مفاهيم البرمجة الاساسية بطريقة ممتعة ومشوقة.
Free program برنامج مجانى	It can be downloaded from its official website and used for free. يمكن تحميل سكراتش من موقعة الرسمى واستخدامه مجاناً.
Developing creative thinking تنمية التفكيرالإبداعى	Scratch helps learners develop their skills in creative thinking and problem-solving. يساعد سكراتش المتعلمين على تطوير مهاراتهم فى التفكير وتنمية التفكيرالإبداعى وحل المشكلات.
Enhancing problem-solving skills تعزيز مهارات حل المشكلات	By trying mistakes and learning from them, students learn how to solve problems in a logical way. من خلال تجربة الأخطاء والتعلم منها، يتعلم الطلاب كيفية حل المشكلات بطريقة منطقية.
Developing Collaboration Skills تنمية مهارات التعاون	- Students can work together on Scratch project. - يستطيع الطلاب العمل معاً فى مشاريع سكراتش. - It enhances teamwork skills. - فهو يعزز مهارات العمل الجماعى.

interface	واجهة	enhancing	تعزيز	teamwork	عمل جماعى
program	برنامج	problem-solving	حل المشكلات	logical	منطقى
developing	تنمية	skill	مهارة		



An exciting start to the world of programming بداية مشوقة لعالم البرمجة	Scratch provides a strong foundation for moving on to more difficult programming languages in the future. يوفر سكراتش اساساً قويًا للإنتقال الى لغات برمجة اكثر صعوبة في المستقبل وبداية مشوقه لعالم البرمجة.
Sharing the project مشاركة المشروع	Projects can be shared with others. يمكن برنامج سكراتش من مشاركة المشاريع مع الآخرين.

Activity :

With the help of your teacher and in cooperation with your classmates, discuss with them how you can start using Scratch to create your first project.

- بمساعدة معلمك وبالتعاون مع زملائك، ناقش معهم كيف يمكنك البدء في استخدام برنامج سكراتش لعمل أول مشروع.

Getting Started with Scratch : البدء في استخدام برنامج Scratch :

1. **Download:** → Scratch can be downloaded for free from its official website.

١ - التحميل: يمكن تحميل برنامج سكراتش مجانًا من موقعه الرسمي،

It can be obtained from the Internet through the link → https://scratch.mit.edu.

يمكن الحصول عليه من الإنترنت من خلال الرابط https://scratch.mit.edu.

2. **Explore:** → Explore the interface and learn how the different blocks and commands work.

٢ - الاستكشاف: استكشف الواجهة وتعرف على كيف تعمل اللبنات والأوامر المختلفة.

3. **Create a project:** → Start by creating a simple project, such as animating a character or creating a short story.

٣ - إنشاء مشروع: ابدأ بإنشاء مشروع بسيط، مثل تحريك شخصية أو إنشاء قصة قصيرة.

4. **Save** the project.

٤ - حفظ المشروع.

Download the program : إنزال البرنامج :

- Through the following website https://scratch.mit.edu/download, the Scratch program is downloaded.

- من خلال الموقع التالي https://scratch.mit.edu/download يتم تنزيل برنامج "Scratch".

explore	الاستكشاف	project	مشروع	through	من خلال
create	ينشئ	website	موقع الكتروني	blocks	لبنات
save	يحفظ	commands	اوامر	download	يحمل من الانترنت

Getting to know the program interface : التعرف على واجهة البرنامج :

(Menu Bar) ①
(Stage Area) ④
⑤ (Sprite Object)
(Command Blocks Area) ②
(Script Area) ③
(Sprites Area) ⑥

① **Menu Bar.**

١ – شريط القوائم.

② **Command Blocks Area.**

٢ – منطقة مجموعات الأوامر "Block Area".

③ **Script Area** → (it collects programming sections "composing a group of graphical commands called blocks in a specific order").

٣ – منطقة البرمجة Script Area (يتجمع بها المقاطع البرمجية « تركيب مجموعة من الأوامر الرسومية وهى تسمى لبنات بترتيب معين »).

④ **Stage Area** → (it shows the result of the work or project).

٤ – منطقة المنصة أو المسرح Stage (يظهر عليها نتيجة العمل أو المشروع).

⑤ **Sprite object.**

٥ – الكائن Sprite.

⑥ **Sprites Area** → (it contains the objects used in the project).

٦ – منطقة الكائنات Sprites (يوجد بها الكائنات المستخدمة بالمشروع).



▸ **Put (✓) in front of the correct sentence and (×) in front of the wrong one :**

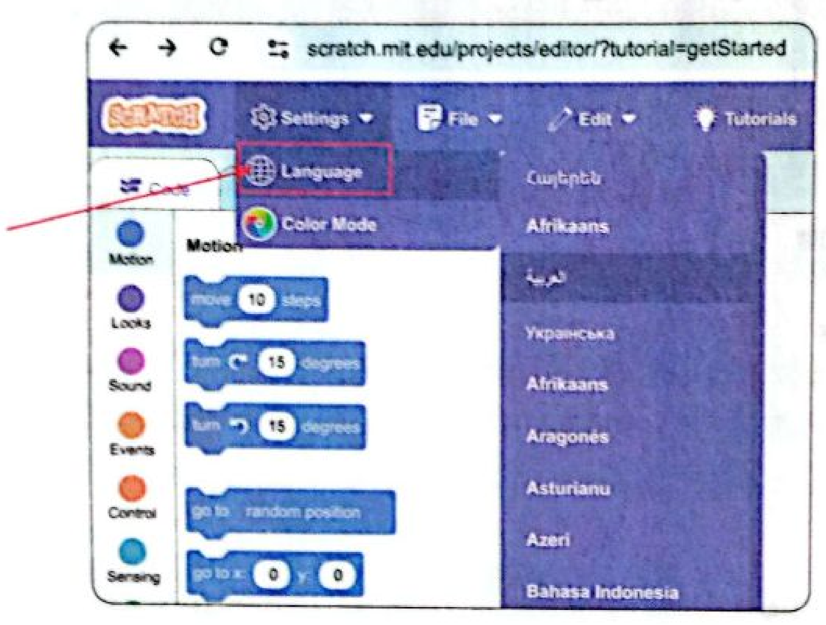
1. Scratch can be downloaded from its official website and used for free. (   )
2. Scratch is specifically designed to teach basic programming concepts. (   )
3. Stage Area shows the result of the work or project. (   )
4. Scratch does not help learners develop their creative thinking skills. (   )

area	منطقة	order	أمر	graphical	بياني
composing	تركيب	specific	محدد	sections	أقسام

Changing the language of the program interface : تغيير لغة واجهة البرنامج:

▶ Try to change the language of the Scratch program interface to Arabic.

ـ حاول تغيير لغة واجهة برنامج Scratch إلى اللغة العربية.



Project 1 What is required in the project is : المطلوب في المشروع هو

- Move the Sprite (cat) on the platform or stage "**30 steps**".

ـ تحريك الكائن (القطة) Sprite على المنصة أو المسرح Stage «٣٠ خطوه».

- Then the phrase **"Good morning"** appears.

ـ ثم ظهور عبارة «صباح الخير».

Implement the project : : تنفيذ المشروع

- To be able to move the sprite (cat) on the stage, follow these steps :

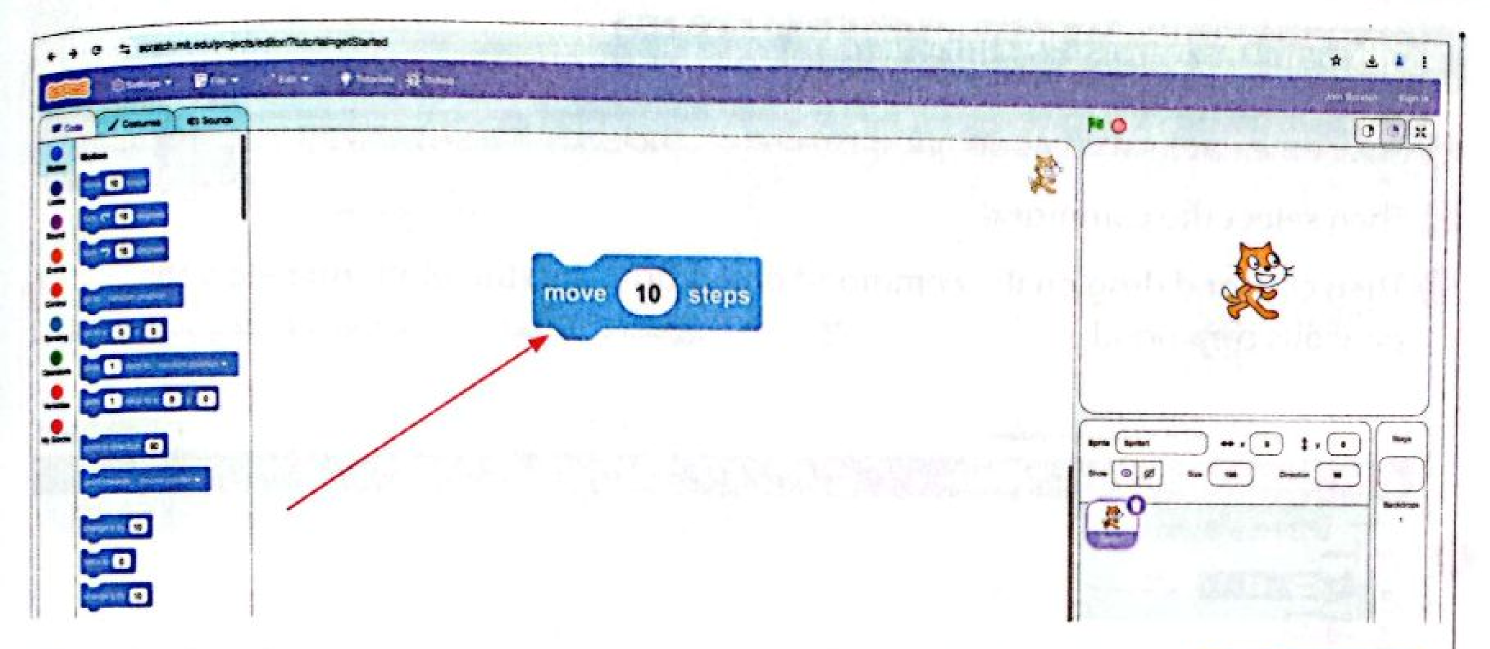
ـ لكى تتمكن من تحريك الكائن (القطة) الموجود على المنصة Stage اتبع الخطوات التالية :

- From the **command blocks** area, **Motion** group, click and drag the command and drop it in **the programming area** Script Area as shown below :



ـ من منطقة مجموعات الأوامر **Blocks Area** مجموعة **Motion** اضغط واسحب الأمر وإلقاؤه فى منطقة البرمجة **Script Area** كما بالشكل التالى :

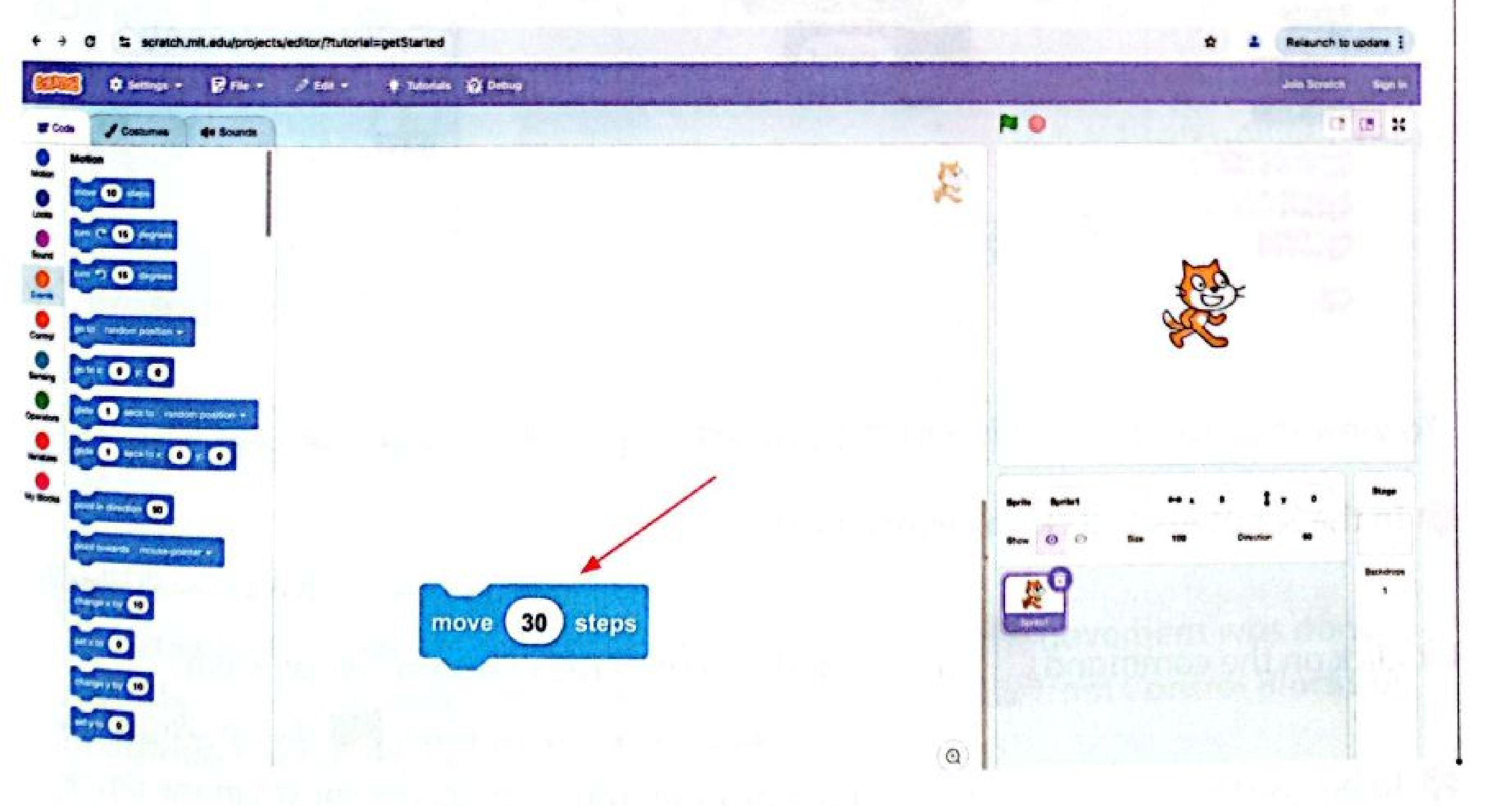
platform	منصة	drop	يلقى	change	يغير
drag	سحب	click	ينقر	language	لغة
phrase	عبارة	implement	تنفيذ		



- To make the object's movement steps **30 steps**, double-click on the value 10 on the **(command)** block and write the **value 30** as in the following figure :



- ولجعل خطوات حركة الكائن 30 خطوة يتم الضغط مرتين على القيمة 10 التى على اللبنة (الأمر) وكتابة القيمة 30 كما فى الشكل التالى :



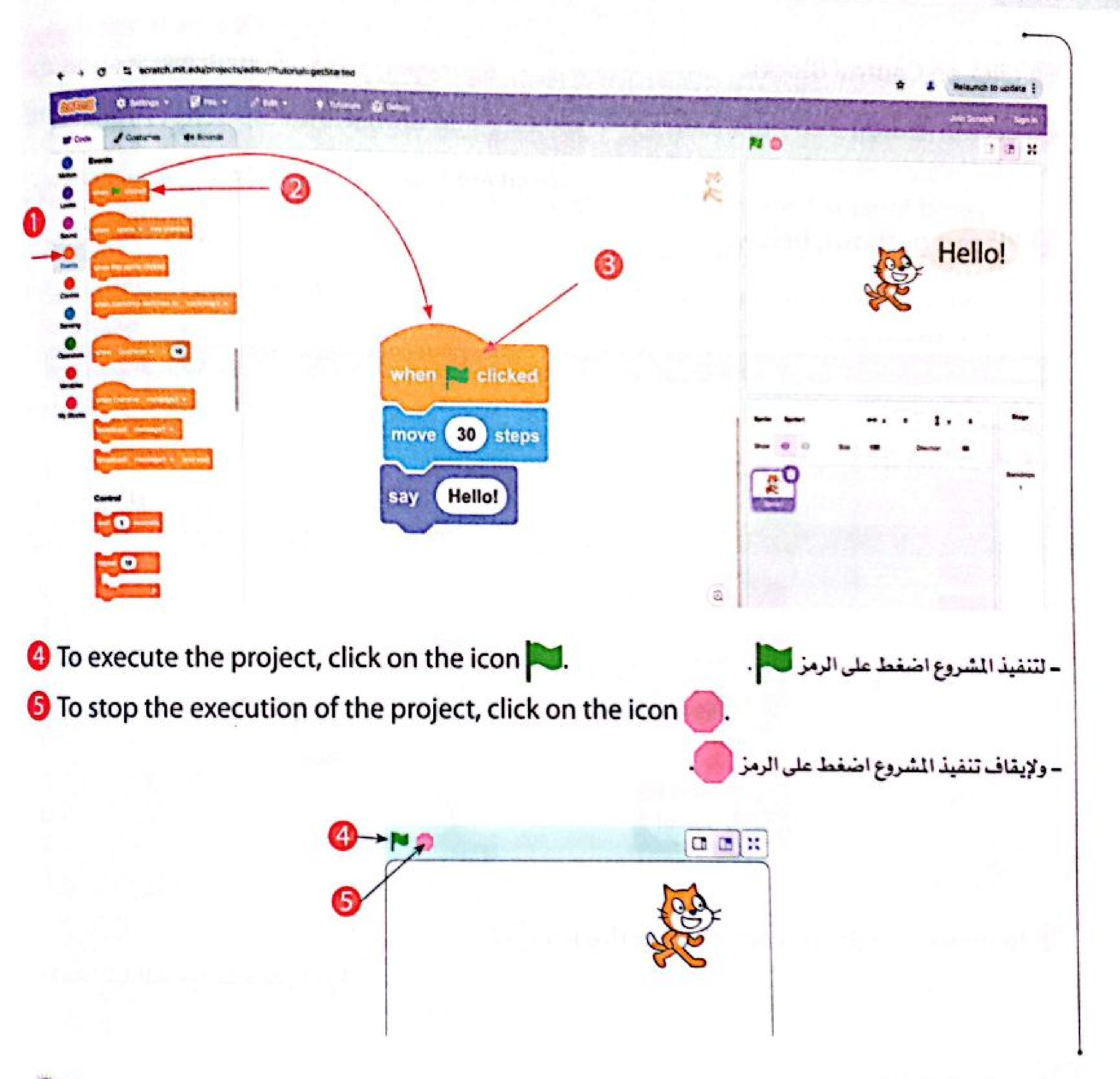
To display the phrase "Hello" : ولإظهار عبارة Hello :



1. Select the **Looks** command group. يتم اختيار مجموعة أوامر Looks.
2. Then **select the command.** ثم اختيار الأمر.
3. Then click and **drag** on the command and drop it into the platform below the previous command. ثم الضغط والسحب على الأمر وإدراجه بالمنصة أسفل الأمر السابق.

To view the implementation of the project steps : لعرض تنفيذ خطوات المشروع :

1. In the Script Area, click on **Events Blocks**.
   - في منطقة البرمجة Script Area اضغط على Events Blocks.
2. Click on the command when clicked and drag it to the platform (Script Area).
   - اضغط على الأمر Clicked when واسحبه وضعه على المنصة.
3. To be installed at the beginning of the programming section as shown in the figure:
   - ليتم تركيبه في بداية المقطع البرمجي كما بالشكل:



4 To execute the project, click on the icon .

- لتنفيذ المشروع اضغط على الرمز .

5 To stop the execution of the project, click on the icon .

- ولإيقاف تنفيذ المشروع اضغط على الرمز .

Note

When executing the previous project, we notice that the movement was done quickly. To address this, we can use the "wait" command from Control Blocks by following the following :

- عند تنفيذ المشروع السابق، نلاحظ أن الحركة تمت بطريقة سريعة، ولمعالجة ذلك يمكن استخدام أمر wait (انتظار) من Control Blocks وذلك باتباع الآتي:

1. Click on **Control Blocks**.

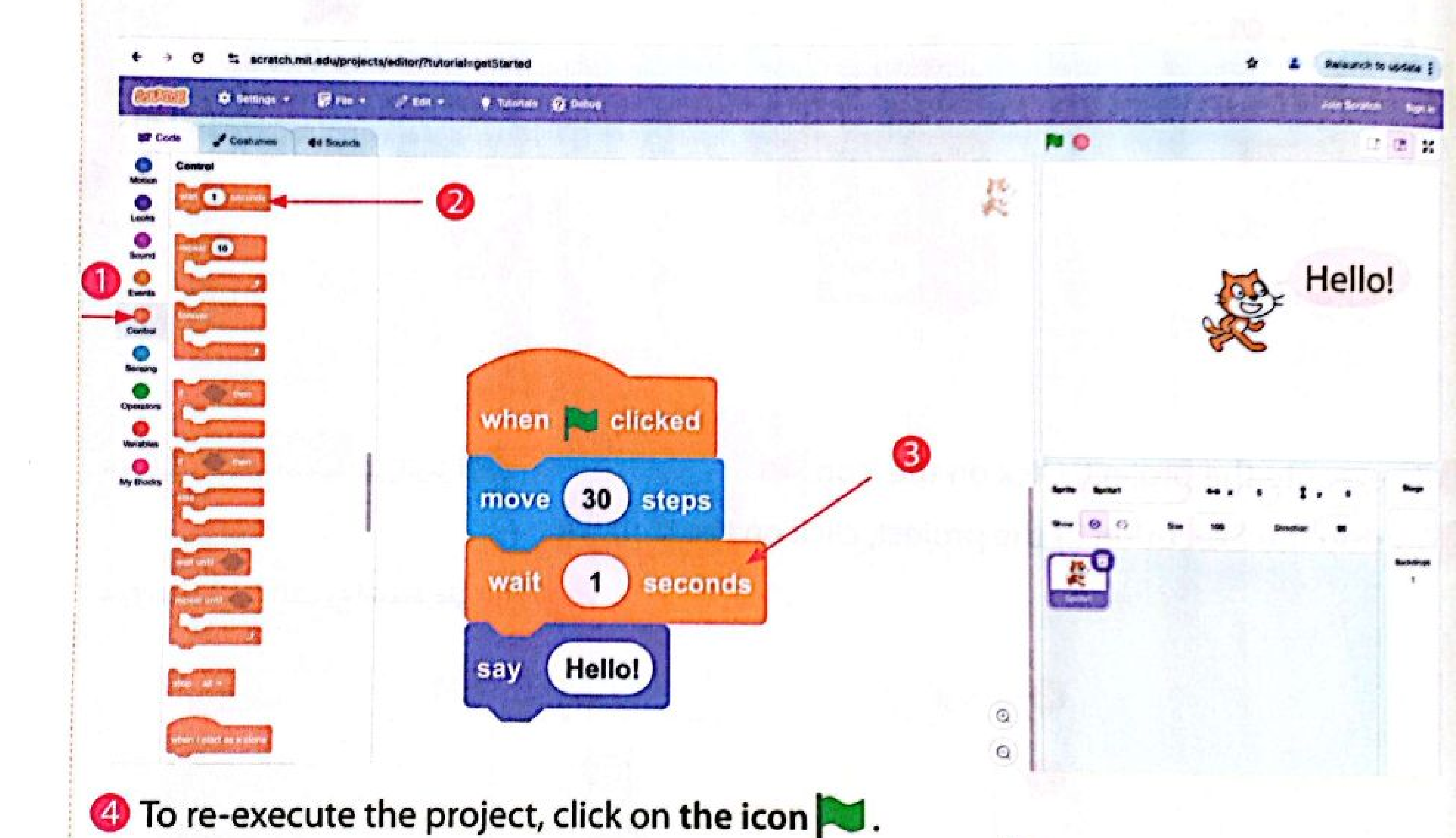
ـ اضغط على Control Blocks.

2. Click and drag a command wait (1) seconds and drop it into the **Script Area**.

ـ اضغط واسحب أمر "wait" والقاءه بمنطقة البرمجة Script Area.

3. Place it as **shown below:**

ـ ضعه كما بالشكل التالى :



4. To re-execute the project, click on **the icon** .

- لإعادة تنفيذ المشروع اضغط على الرمز .

Important Notes :

- The **wait value** represents (**1 second**).
- قيمة الانتظار يمثل (١ ثانية).
- Installing a set of commands in a specific order called a **code section.**
- تركيب مجموعة من الأوامر في ترتيب معين تسمى **المقطع البرمجي**.
- Use Click, **drag and drop** to deal with any command **(within)** the **code section.**
- استخدم الضغط والسحب والإفلات للتعامل مع أي أمر (داخل) المقطع البرمجي.

Modify the project 1

Modify the previous project to make the movement continuous

تعديل في المشروع (١): عدل في المشروع السابق لجعل الحركة مستمرة :

- To make the movement continuous ,you can install the command **several times.**

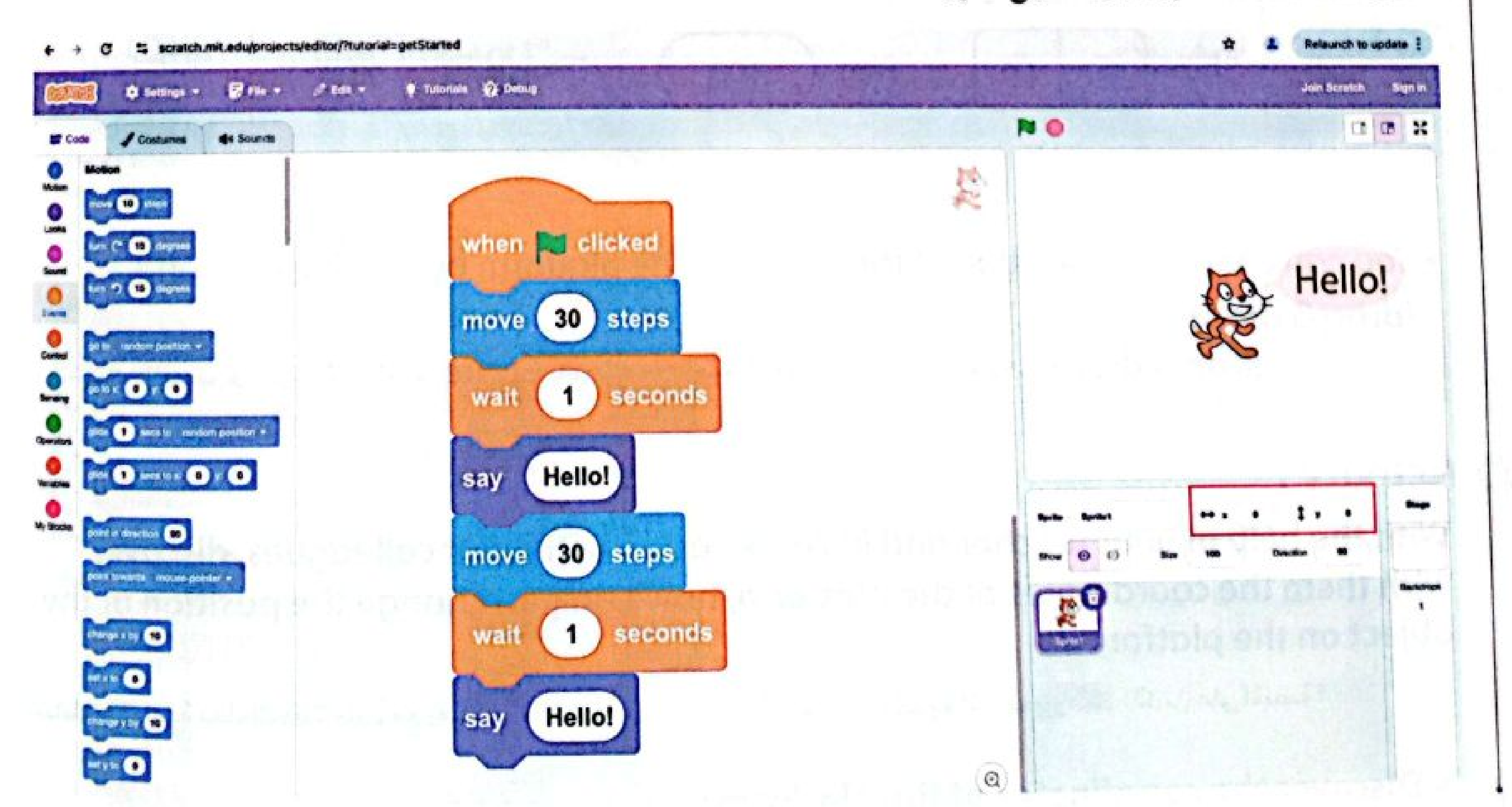
- لجعل الحركة مستمرة يمكنك تركيب الأمر عدة مرات.

- Re-arrange it by clicking and dragging to the place where you want to start the repetition.

- اعد ترتيبه وذلك بالضغط والسحب للمكان الذي تريد بدأ التكرار فيه.

- Modify the word **"Hello!"** to the phrase **"Good morning".**

- عدل كلمة **"Hello!"** إلى عبارة «صباح الخير».



Activity :

With the help of your teacher and in cooperation with your colleagues ,discuss with them how you can:

نشاط: بمساعدة معلمك وبالتعاون مع زملائك ناقش معهم كيف يمكنك:

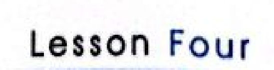
- Determine the value of the object's coordinates on the platform?

- تحديد قيمة إحداثيات الكائن على المنصة؟

- Change the value of the object's coordinates on the platform?

- تغيير قيمة إحداثيات الكائن على المنصة؟






Note that :

Before implementing the project ,the value of the object's coordinates on the platform is:

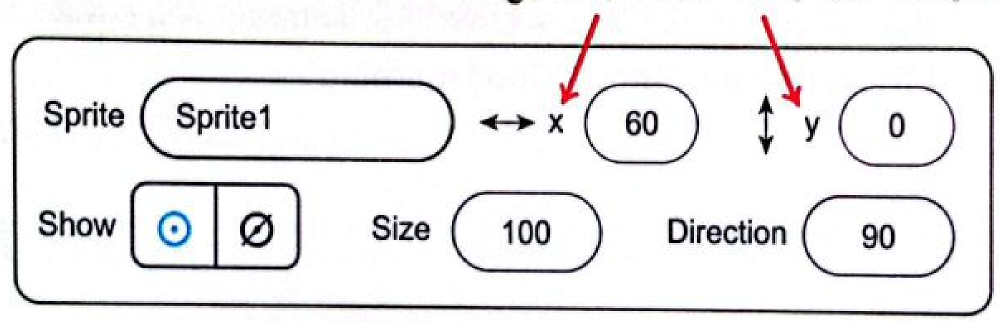
لاحظ أن: قبل تنفيذ المشروع قيمة إحداثيات الكائن على المنصة هي:

X = 0 which is the horizontal axis and represents horizontal movement , Y = 0 which is the vertical axis and represents vertical movement.

X = 0 وهي المحور الأفقي وتمثل الحركة الأفقية ، Y = 0 وهى المحور الرأسي وتمثل الحركة الرأسية.

Implement the project Note the value X = 0 and the value Y = 0 after implementing the project.

نفذ المشروع لاحظ القيمة X = 0 والقيمة Y = 0 بعد تنفيذ المشروع.



- You can control the position of the Sprite on the platform by clicking on it and (drag & drop).

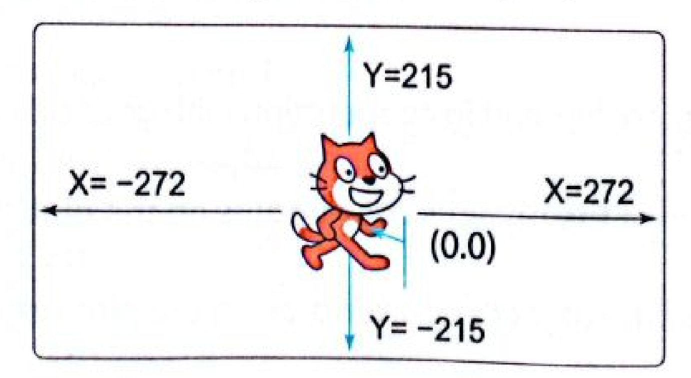
- يمكن التحكم في تغيير مكان الكائن Sprite على المنصة بالضغط عليه و (السحب والإفلات) **drag & drop**.


Activity :

With the help of your teacher and in cooperation with your colleagues, discover with them the coordinates of the platform, how can you change the position of the object on the platform?

نشاط: بمساعدة معلمك وبالتعاون مع زملائك اكتشف معهم إحداثيات المنصة، كيف يمكنك تغيير مكان الكائن على المنصة؟

▶ **Discover the coordinates of the platform** اكتشف إحداثيات المنصة





Note

Also you can change Sprite location on Stage through changing the value of (X , Y) axis :

وايضًا يمكن تغيير مكان الكائنات على المنصة من خلال تغيير قيمة المحورين (X , Y).

Save the project in a file : حفظ المشروع داخل ملف

To save your project, do the following:

لحفظ مشروعك قم بعمل التالي:

1. From the **File menu** ,choose **Save to your computer.**

   ١ - من قائمة **File** اختر **Save to your computer.**

2. **Select a location** to save the file on one of the storage media.

   ٢ - حدد مكان حفظ الملف على أحد وسائط التخزين.

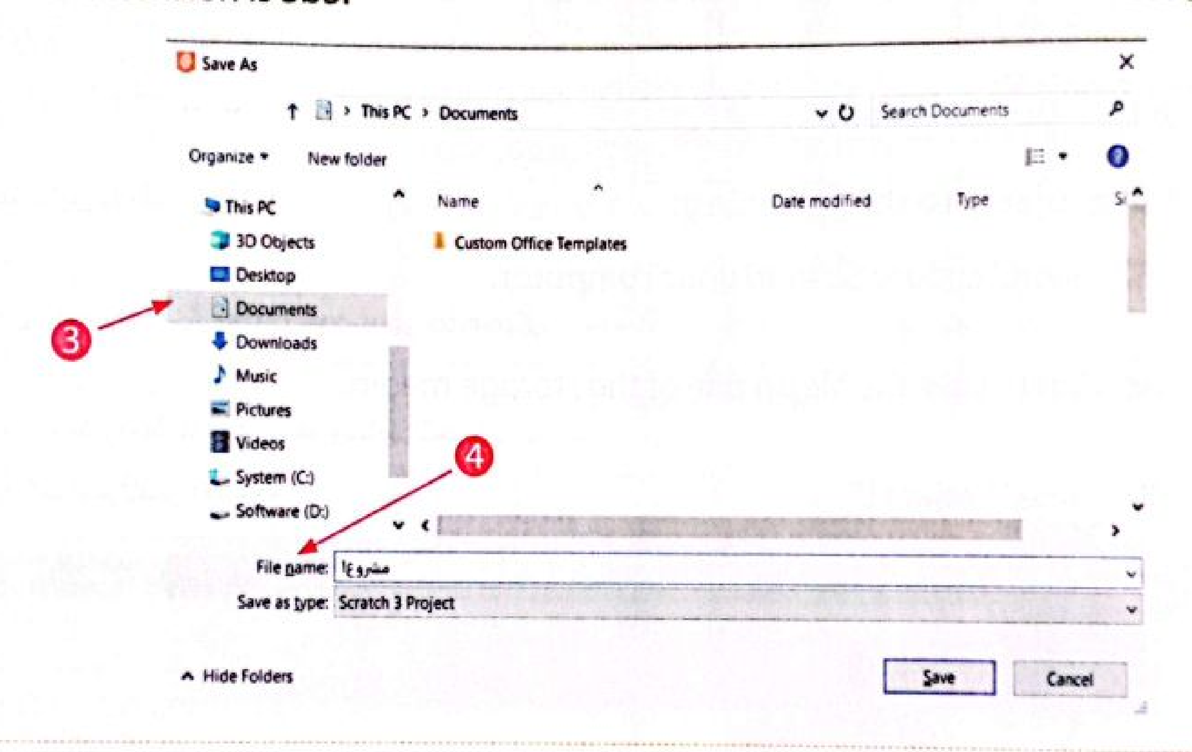
3. Type the file name **"Project1"**

   ٣ - اكتب اسم الملف «مشروع١»

Note

The file name is " Project1 sb3".
The file extension is Sb3.

اسم الملف هو sb3. مشروع١.
امتداد الملف هو Sb3.





▶ **Put (✓) in front of the correct sentence and (✗) in front of the wrong one :**

1. The correct file extension for Scratch is Sb2. ( )
2. In Scratch, X is the horizontal axis and Y is the vertical axis. ( )
3. Y coordinates represent the horizontal movement of the object on the stage. ( )

Stop here !



نقاط هامة وعبارات استرشادية تمكنك من تلخيص وإتقان الدرس.

Lesson Summary

- Scratch is a free educational tool designed to teach the basics of programming in a visual and fun way without the need to write complex code.

– برنامج سكراتش (Scratch) هو أداة تعليمية مجانية مصممة لتعليم أساسيات البرمجة بطريقة مرئية وممتعة دون الحاجة إلى كتابة أكواد معقدة.

- The program is based on a simple interface that uses programming "building blocks" that are assembled in a specific order to create projects such as games, comics, simulations, and music.

– يعتمد البرنامج على واجهة بسيطة تستخدم «اللبنات» البرمجية التي تجمع بترتيب معين لإنشاء مشاريع مثل الألعاب، القصص المصورة، المحاكاة، والموسيقى.

- **Features of the Scratch program :** — **مميزات البرنامج:**
- It uses a visual interface based on blocks. — يستخدم واجهة مرئية تعتمد على اللبنات.
- It is free and available for download from the official website. — مجاني ومتاح للتنزيل من الموقع الرسمي.
- Scratch program helps develop creative thinking and problem-solving skills.

– يساعد على تنمية مهارات التفكير الإبداعي وحل المشكلات.

- It encourages collaboration and teamwork. — يشجع على التعاون والعمل الجماعي.
- It provides a strong foundation for moving on to advanced programming languages.

– يوفر أساسا قويًا للانتقال إلى لغات برمجة متقدمة.

- **Scratch program components :** — **مكونات البرنامج:**
- **Script Area:** To collect programming sections. — منطقة البرمجة (Script): لتجميع المقاطع.
- **Stage Area:** To display the results of the project. — منطقة المسرح (Stage): لعرض نتائج المشروع.
- **Sprites Area:** To select the objects used.

– منطقة الكائنات (Sprites): لتحديد الكائنات المستخدمة.

- Menu bar and command **Blocks Area**. — شريط القوائم ومنطقة الأوامر.



How to deal with the exam

كلمات و عبارات إسترشادية تساعدك على حل أسئلة الامتحان.

Topic	Guiding words	Exam items
Scratch	Scratch	Scratch can be downloaded from its official website and used for free.
	blocks - commands	Scratch uses a visual interface based on blocks (bricks or commands).
	problem - solving	Scratch helps learners develop their skills in problem-solving.
	Script Area	Script Area collects programming sections.
	Stage	Stage Area shows the result of the work or project.
	code section	Installing a set of commands in a specific order called a code section.



General Exercises

On Lesson Four

يمكنك حل الدرس وتصويبه إلكترونيًا

▸ If you got 🔴 you need to revise the lesson again.

🔵 ممتاز 🟢 جيد جدًا 🟡 جيد 🔴 غير جيد

قم بتقييم نفسك بالعلامات الموضحة وإذا حصلت على 🔴 [غير جيد] قم بمراجعة الدرس مرة أخرى من الصفحة السابقة.

El-Moasser Exercises

1 Choose the correct answer from a, b, c or d.

1. .... is the main goal of the Scratch program.
   - a. Designing websites
   - b. Teaching the basics of programming in a visual and fun way
   - c. Creating complex programs for professional programmers
   - d. Developing cell phone applications

2. .... is one of the advantages of the Scratch program.
   - a. Complex interface
   - b. Requires complex coding
   - c. Free and available for download
   - d. Focuses only on advanced programming

3. .... is the primary function of blocks in Scratch.
   - a. File management
   - b. Organizing code
   - c. Playing acoustics
   - d. Controlling program settings

4. The Scratch program can be downloaded from ....
   - a. paid App Store
   - b. the official website of the program
   - c. email
   - d. a CD-ROM

5. .... is an area used to assemble building blocks in Scratch.
   - a. Stage area
   - b. Script Area
   - c. Menu bar
   - d. Sprites Area

6. Purpose of using the "wait" command in Scratch is ....
   - a. automatically launch the project
   - b. stopping the project
   - c. control the execution time of commands
   - d. change the interface language

7. The Scratch program's interface language can be changed via ....
   - a. menu bar
   - b. keyboard
   - c. installing the program
   - d. the browser settings

2 Complete the following sentences with the appropriate words in brackets.

(Command Block – Stage Area – Control Block – Script Area – Sb3)

1. An area in the Scratch program where the blocks are assembled to form is called ....

2. The area in the Scratch program where the results of a project or action are shown is called ....
3. .... is the tool in Scratch that used to delay the execution of commands for a specified period of time.
4. .... is the default file format (extension) in which a Scratch project is saved.
5. A set of code commands arranged in a specific order to perform specific tasks in a Scratch program is called ....

3 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. The "wait" command is used to change the speed of command execution in Scratch. ( )
2. Sprites in the Scratch program appear in the Stage Area. ( )
3. X coordinates represent the horizontal movement of the object on the stage. ( )
4. The default file format for Scratch projects is "exe". ( )
5. The interface language of the Scratch program can be changed to Arabic. ( )
6. Scratch helps develop creative thinking and problem-solving skills. ( )
7. The Stage area is used to assemble building blocks. ( )

Student's Book Exercises

• Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. The Scratch program provides a very wide range of ideas that can be programmed. ( )
2. The Scratch program helps the student learn the principles of programming. ( )
3. The Scratch program is considered a difficult educational tool to use. ( )
4. The student in the Scratch program needs to write a lot of complex codes. ( )
5. Scratch uses a visual interface based on blocks. ( )
6. The Scratch program is paid. ( )
7. In the Scratch program, students face difficulty in sharing projects with others. ( )
8. In the Scratch program, the Stage area shows the programming sections. ( )
9. In the Scratch program, the result of the work or project appears in the Area Blocks area. ( )
10. To implement the project, click on the symbol. ( )



Revision

on Lessons 3 & 4

مراجعة عامة على الدرسين الثالث والرابع فى ورقة واحدة

Lesson 3 : Robots

1

What is a robot and its types ?

- A robot is a device that can be programmed to perform a set of specific tasks automatically.
- Among its types are (educational, medical, industrial, household) robots.
- The robot consists of structure, sensors, motors, power source and software.
- Safety, employment and ethics are among the top challenges of robotic technology.

2

Benefits of robots

Robots have become part of our daily lives and are used in several fields, such as medicine, industry, and education and its benefits include:

1. Increased efficiency and productivity
2. High accuracy and reduced errors
3. Safety and security
4. Adapt ability to diverse work
5. Reduce costs in the long run
6. Contributing to development

Lesson 4 : Scratch

1

Features of Scratch program

- Scratch is a free educational tool designed to teach the basics of programming in a visual and fun way without the need to write complex codes.
- It uses a visual interface based on blocks.
- Free and available for download from the official website.
- It helps to develop creative thinking and problem-solving skills.
- It encourages collaboration and teamwork.
- It provides a strong foundation for moving on to more difficult programming languages.

2

Program components and how to use it

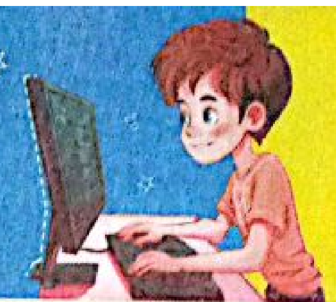
- Script Area: Collects programming sections.
- Stage area: to display the results of the project.
- Sprites Area : Specifies the objects used.
- Menu bar and command Blocks Area for navigating between functions.

How to use:

1. Download it from the official website.
2. Explore the interface and learn its basics.
3. Create simple projects (such as animating a character or creating a short story).
4. Save the project as "sb3".

Accumulative Test

On Lessons 3&4



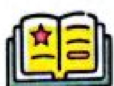
اختبار تراكمي على الدرسين الثالث والرابع

1 Choose the correct answer from a, b, c or d.

1. .... is one of the benefits of robots.
   a. Increased productivity
   b. Work continuously without fatigue
   c. Perform repetitive tasks
   d. All of them
2. .... is one of the advantages of the Scratch program.
   a. complex interface
   b. Requires writing complex code
   c. Free download
   d. It focuses only on advanced programming.
3. .... is used to change the language of the Scratch program interface.
   a. Keyboard
   b. Reinstall the program
   c. From the browser settings
   d. Menu bar
4. Safety, Employment, and ethics are the .... of robotic technology.
   a. features.
   b. challenges
   c. types
   d. advantages
5. .... is an area used to assemble the building blocks of Scratch.
   a. Stage Area
   b. Script Area
   c. Menu bar
   d. Sprites Area
6. .... includes algorithms that determine how the robot responds to information it receives from sensors.
   a. Structures
   b. Software
   c. Engines
   d. Communication tools

2 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. Robots cannot rely on solar cells as a source of energy. ( )
2. Medical robots help doctors perform surgeries ( )
3. Scratch provides a very wide choice of ideas that can be programmed. ( )
4. The robot vacuum cleaner has sensors to avoid collisions with furniture. ( )
5. Scratch is a non-free program that makes presentations ( )
6. The result of the work or project in the Scratch program appears on the Stage Area. ( )



يمكنك المراجعة باستمرار (تراكمية)
من خلال الصفحة السابقة.

LESSON 5

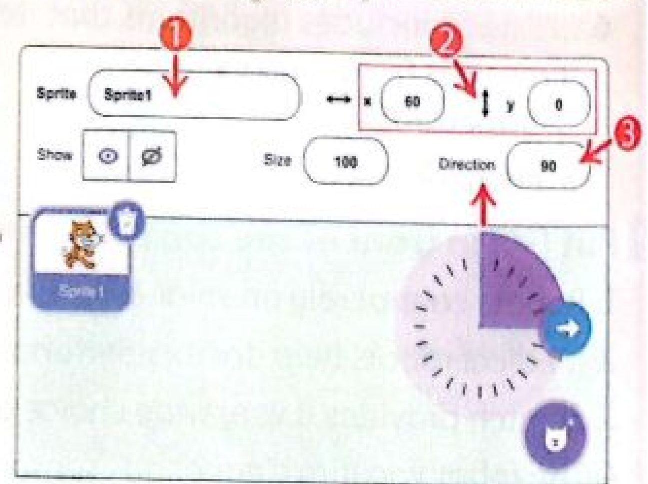
Sprites Area in Scratch

Scratch برنامج سكراتش

- **Sprites area in Scratch** → contains the sprites used in the project.

- منطقة الكائنات **Sprites** في برنامج سكراتش يوجد بها الكائنات المستخدمة بالمشروع.

Example of Sprites in the project



1. **The name of the sprite:** you can modify it by clicking on it and renaming it.

   ١- اسم الكائن : يمكنك تعديله بالضغط عليه وإعادة تسميته.

2. **The location of the sprite and determines it:**
   the horizontal axis is → **the X values**
   the vertical axis is → **the Y values**

   ٢- مكان الكائن ويحدده: المحور الأفقى ← قيم X والمحور الرأسى ← قيم Y .

Note

The current location of the sprite (cat) on the platform is (60,0). المكان الحالى للكائن (القطة) على الصفحة هو (60,0)

3. **The direction** of the sprite's movement → you can change the direction by changing the Direct value.

   ٣- اتجاه حركة الكائن: يمكنك تغير الاتجاه بتغير قيمة **Direction**.

project	مشروع	modify	تعديل	rename	يعيد تسمية	determine	يحدد

4 **Show or hide the sprite** on the platform.

٤- إظهار الكائن أو إخفاءه على المنصة.

5 **The size of the sprite** and its value can be changed.

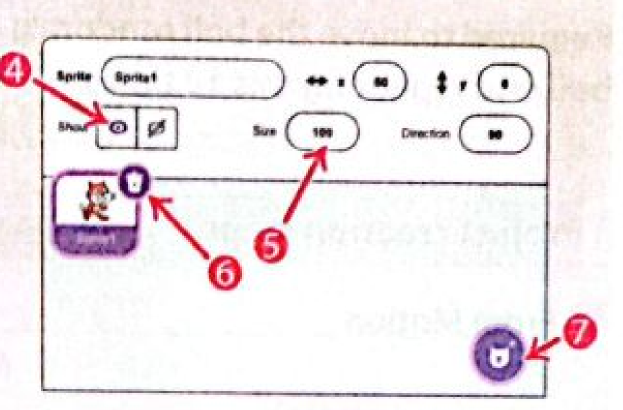
٥- حجم الكائن ويمكن تغيير قيمته.

6 **Delete the sprite** from the platform.

٦- حذف الكائن من على المنصة.

7 **Add a new sprite** Choose Sprite.

٧- إضافة كائن جديد Choose Sprite.



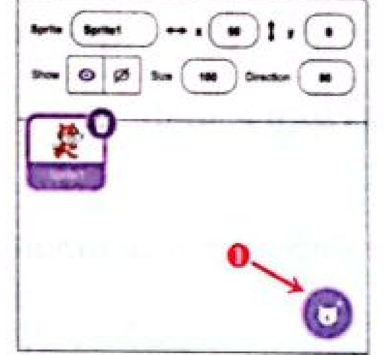
Project 1 Add a new sprite : إضافة كائن جديد

▸ **To add a new sprite in the sprites area :**

◂ لإضافة كائن جديد في منطقة الكائنات:

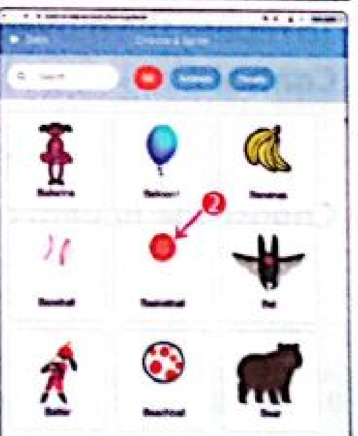
1 Click on **Choose Sprite**

- اضغط على **Choose Sprite** اختر كائن



2 Select **Basketball**

- اختر كرة السلة **Basketball**



3 Remove the **cat sprite** from the stage.

- احذف كائن القطة من على المنصة.



platform	منصة	size	حجم	delete	حذف
remove	حذف	add	يضيف		

Project 2

Required to move the ball randomly on the platform while making a sound for the ball and repeating this 10 times:

مطلوب تحريك الكرة حركات عشوائية على المنصة مع إصدار صوت للكرة مع تكرار ذلك ١٠ مرات.

Project creation steps : خطوات إنشاء المشروع :

1. **From Motion**

   ١- من Motion

2. **Choose the Go to random position command**

   ٢- اختر أمر Go to random position

3. **From Sound**

   ٣- من Sound

4. **Choose the command Play sound**

   ٤- اختر الأمر Play sound

5. **To repeat the movement 10 times from Control**

   ٥- ولتكرار الحركة ١٠ مرات من Control

6. **Choose the Repeat command**

   ٦- اختر الأمر Repeat

To execute the project : ولتنفيذ المشروع :

7. **From Events**

   ٧- من Events

8. **Choose the when Clicked command**

   ٨- اختر الأمر when Clicked

Test the execution of the project اختبر تنفيذ المشروع

randomly	بشكل عشوائي	sound	صوت	movement	حركة
required	مطلوب	command	أمر	execution	تنفيذ

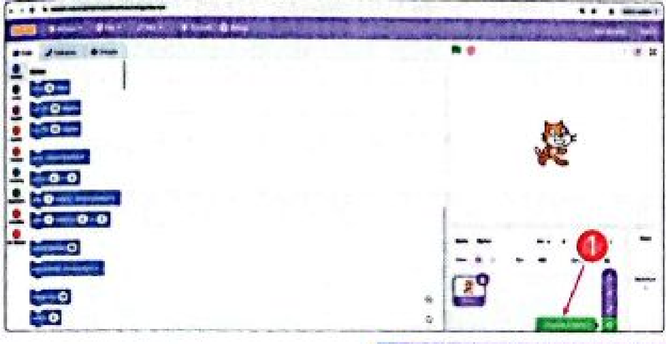


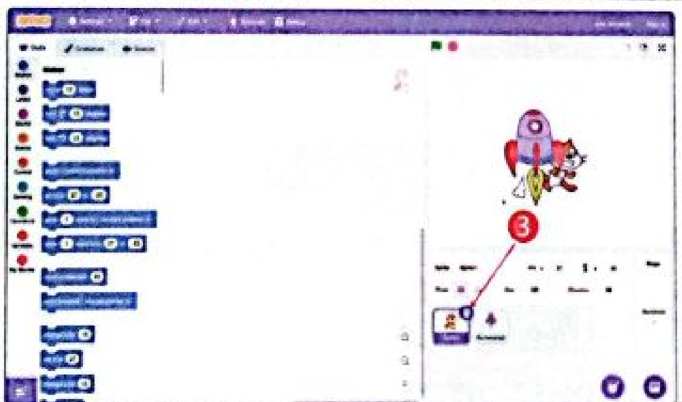
▸ Put (✓) or (✗) for the following sentences.

1. You cannot modify the name of the Sprite in the Scratch program. ( )
2. The sprite can be shown or hidden on the stage. ( )
3. The when [green flag] clicked command is in the Events group. ( )

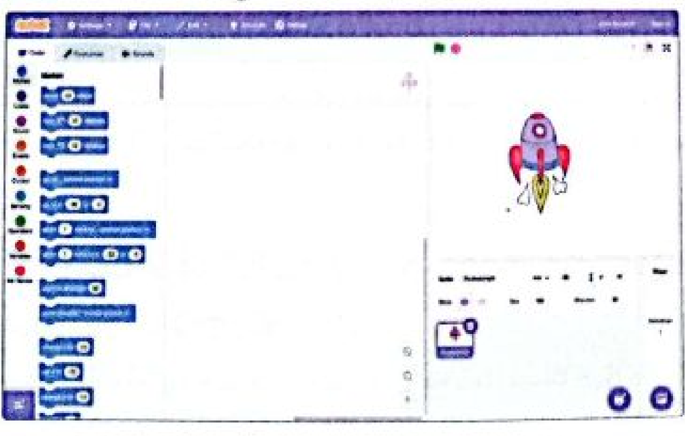
Project 3 Spaceship

▸ Insert a new sprite Rocketship. إدراج كائن جديد Rocketship





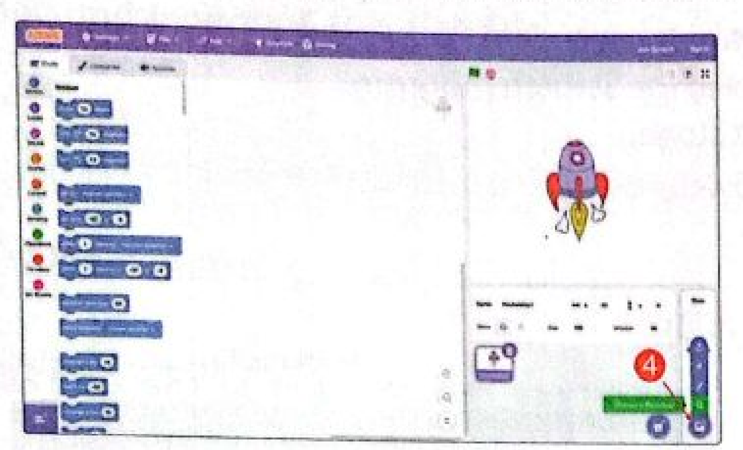
▸ Remove the cat sprite from the stage. احذف كائن القطة من على المنصة.



stage منصة remove يحذف

- Insert a new background by clicking on Choose a Backdrop, browse through the different backgrounds and then choose "Space".

ادرج خلفية جديدة وذلك بالضغط على Choose a Backdrop، تجول وسط الخلفيات المختلفة ثم اختر "Space".





Project Implement Project قم بتنفيذ المشروع





Activities and Projects:

Project Square Drawing Project مشروع رسم مربع



1 Open a new project:

Open Scratch and start a new project.

١- فتح مشروع جديد : افتح برنامج سكراتش وابدأ مشروعاً جديدًا.

2 Select the pen:

- Use the "pen" to draw our picture.
- In the code area, find the "pen" section and drag the "pen" block down.
  - This block will make the "pen" start drawing.

٢- اختيار القلم: استخدم «القلم» لرسم صورتنا . في منطقة الكود، ابحث عن قسم «القلم» وسحب اللبنة «القلم لأسفل.» هذه اللبنة ستجعل القلم يبدأ في الرسم.

Note

Click on Add Extension and the pen → Blocks will appear as shown in the opposite figure.

بالضغط على Extension Add ← ثم تظهر لبنات القلم كما بالشكل المقابل .

3 Setting Color and Size:

Before you start drawing, you can set the line color and size using the blocks in the "Pen "section.

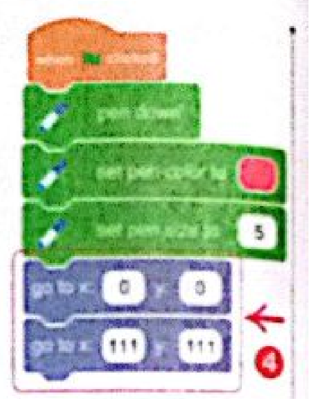
٣- تحديد اللون والحجم: قبل البدء بالرسم، يمكنك تحديد لون الخط وحجمه باستخدام اللبنات الموجودة في قسم «القلم».

For Example :

You can use the" **Set Pen Color to** "block to → choose a specific color ,and the **Set Pen Size to** "block to → set the line thickness.

يمكنك استخدام اللبنة «تعيين لون القلم إلى » لاختيار لون معين، واللبنة «تعيين حجم القلم إلى » لتحديد سمك الخط.

start	يبدأ	draw	يرسم	section	قسم	specific	معين



4 Moving the Pen:

- Use the "Go to x : y :" block to → set the starting point
- then use the "Go to x : y:" block again to → set the ending point
- This will make the pen draw a straight line between the two points.

٤- تحريك القلم: استخدم لبنة «اذهب إلى " x:y: " لتحديد نقطة البداية، ثم استخدم لبنة «اذهب إلى " x:y: " مرة أخرى لتحديد نقطة النهاية. هذا سيجعل القلم يرسم خطا مستقيما بين النقطتين.

5 Repeating Steps: Repeat the previous steps to draw more lines and form the shape you want.

٥- تكرار الخطوات: كرر الخطوات السابقة لرسم المزيد من الخطوط وتكوين الشكل الذي تريده.

Notes

- **Drawing different shapes:** You can draw any geometric shape by setting the start and end points of the lines appropriately.
  - رسم أشكال مختلفة : يمكنك رسم أي شكل هندسي عن طريق تحديد نقاط بداية ونهاية الخطوط بشكل مناسب.
- **Adding details:** You can add details to your image such as **eyes, mouth, and ears.**
  - إضافة التفاصيل: يمكنك إضافة تفاصيل إلى صورتك مثل العيون والفم والأذنين.

Project Drawing a circle رسم دائرة

▶ To draw a circle → You can use the "**Repeat**" block to repeat the process of drawing short lines at different angles → This helps with the **circle drawing effect.**

لرسم دائرة، يمكنك استخدام لبنة «كرر» لتكرار عملية رسم خطوط قصيرة بزوايا مختلفة، هذا يساعد في تأثير رسم الدائرة.

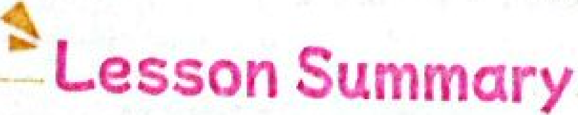
repeat	يكرر	staight line	خط مستقيم	geometric	هندسى	appropriately	بشكل مناسب
process	عملية	effect	تأثير				





استمع إلى ملخص الدرس

نقاط هامة وعبارات استرشادية تمكنك من تلخيص وإتقان الدرس.



The Sprites area in Scratch منطقة الكائنات (Sprites) في سكراتش



◀ تستخدم لتعديل خصائص الكائنات في المشروع وتشمل:

1. تعديل اسم الكائن.
2. تحديد موقعه باستخدام المحاور X و Y.
3. ضبط اتجاه حركته (Direction).
4. إظهاره أو إخفاؤه.
5. تغيير حجمه.
6. حذفه أو إضافة كائن جديد.

1. Modifying the name of the object.
2. Locate it using the X and Y axes.
3. Set the direction of its movement (Direction).
4. Show or hide it.
5. Resize it.
6. Delete it or add a new object.

Activities and projects نشاطات ومشروعات

- **Project:** To be move the ball randomly with a sound and repeat this 10 times follow these steps:

◀ **مشروع :** يمكن تحريك كرة عشوائيًا مع إصدار صوت وتكرار ذلك 10 مرات باستخدام الأوامر:

- Motion: Go to random position
- Sound: Play sound
- Control: Repeat



How to deal with the exam

كلمات و عبارات استرشادية تساعدك على حل أسئلة الامتحان.

Topic	Guiding words	Elements of the Exam
Sprites Area in Scratch	Sprites Area	Sprites area shows the sprites used in the project.
	direction	You can change the direction by changing a Direction value.
	New Sprite	Press Choose Sprite to add a new sprite.
	circle - repeating	A circle can be drawn in Scratch by repeating short lines at different angles.

General Exercises

On Lesson Five



ممتاز - جيد جدا - جيد - غير جيد

▸ If you got 🔴 you need to revise the lesson again.

قم بتقييم نفسك بالعلامات الموضحة وإذا حصلت على 🔴 (غير جيد) قم بمراجعة الدرس مرة أخرى من الصفحة السابقة.

El-Moasser Exercises

1 Choose the correct answer from a, b, c or d.

1. The location of the sprite in Scratch on the platform can be determined by ....
   - a. X and Y axises
   - b. changing of direction
   - c. name change
   - d. using the Play sound brick
2. .... is an option that allows adding a new sprite in the sprites area.
   - a. Delete the object
   - b. Choose Sprite
   - c. Change Size
   - d. Play sound
3. In the "Moving the Ball" project, choose .... from Motion to make the ball move randomly.
   - a. when 🏁 clicked
   - b. Play sound
   - c. Repeat
   - d. Go to random position
4. .... is the option required to activate the pen tool.
   - a. Choose Sprite
   - b. Add Extension
   - c. Go to random position
   - d. Change Size
5. A circle can be drawn in Scratch by ....
   - a. Moving the pen in a straight line
   - b. Repeating short lines at different angles
   - c. Using the Play sound command
   - d. Changing the name of the sprite

2 Complete the following sentences with the appropriate words in brackets.

(sprites area - Direction - Repeat - Pen blocks - Go to random position)

1. .... an area in the Scratch program that contains the sprites used in the project and is used to modify their properties.
2. .... is a command used to move the sprite to a random location on the platform.
3. .... is a tool from Add Extension that is used to draw geometric shapes.
4. A .... block used to repeat a set of commands a specified number of times.
5. .... is a property that determines the direction in which the object moves on the stage.

3 **Put (✓) in front of the correct sentence and (x) in front of the wrong one.**

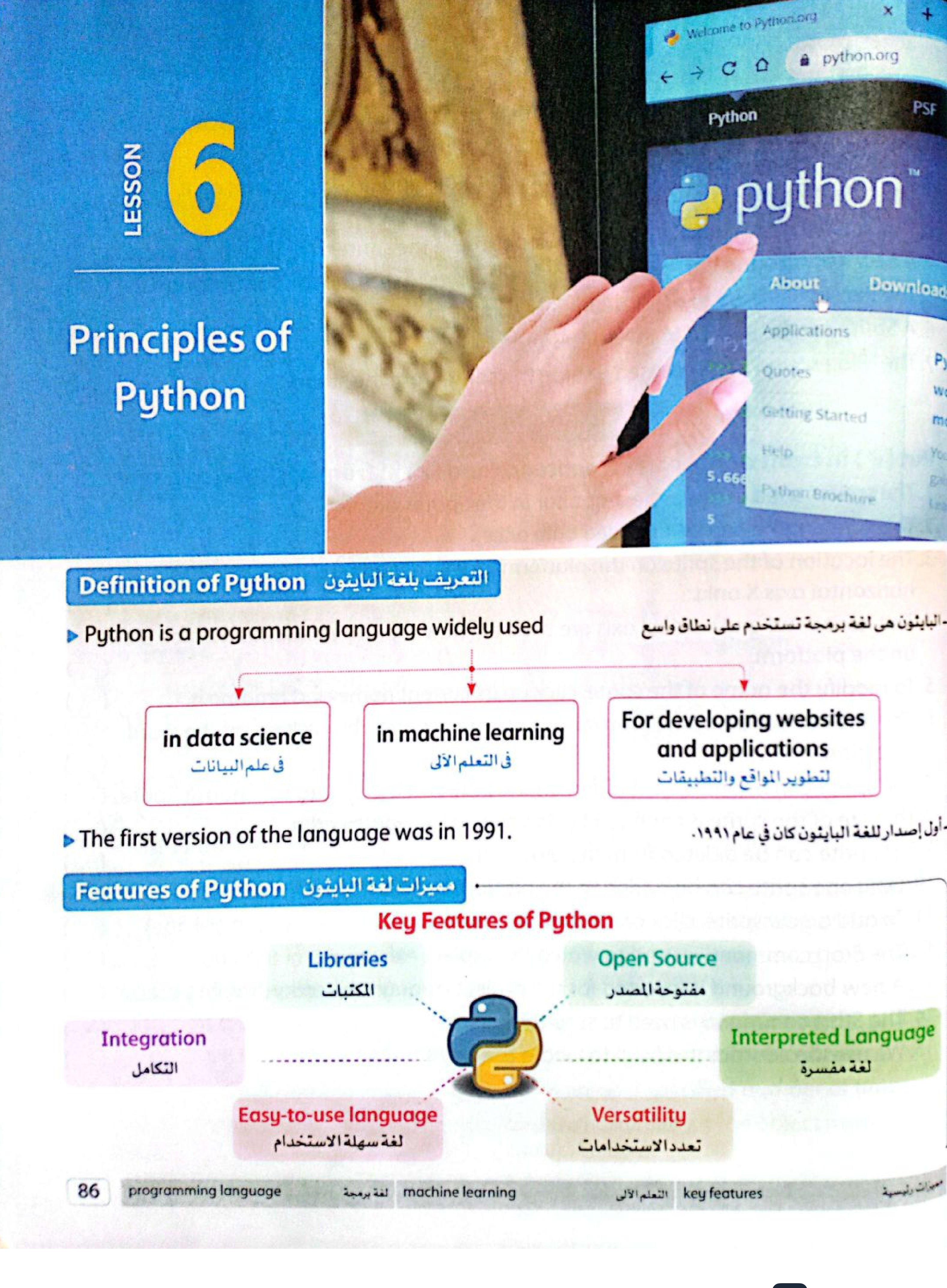
1. The default location of the sprite on the platform is (100, 80). ( )
2. The name of the object in the sprite area can be modified by clicking on it and renaming it. ( )
3. The "Go to random position" block is used to move the sprite to a random location. ( )
4. A new background can be added to the project via the Choose Sprite option. ( )
5. The Pen tool is used to draw geometric shapes in Scratch. ( )
6. A Sprite can be resized in the Sprites area. ( )
7. The "Play sound" block is used to hide the sprite from the stage. ( )

Student's Book Exercises

• **Put (✓) in front of the correct sentence and (x) in front of the wrong one.**

1. The sprites used in the project appear in the Sprites area. ( )
2. The sprite name can be modified only once. ( )
3. The location of the sprite on the platform is determined by the value of the horizontal axis X only. ( )
4. The horizontal and vertical axis are used to know the current location of the sprite on the platform. ( )
5. To modify the name of the sprite, click on its current name and rename it. ( )
6. The direction of the sprite's movement can be changed by clicking on the word Direction. ( )
7. The sprite can be shown or hidden on the platform by clicking on Choose Sprite. ( )
8. The size of the sprite is changed by its value in the Sprites area. ( )
9. The sprite can be deleted from the platform. ( )
10. Only one sprite can be added to the platform. ( )
11. To add a new sprite, click on Choose Sprite. ( )
12. The Stop command is used to watch the project execution. ( )
13. A new background is inserted for the project through the programming area. ( )
14. The Start command is used to stop the project. ( )
15. We use the coordinates (x, y) to locate the point on the stage. ( )





LESSON 6

Principles of Python

Definition of Python التعريف بلغة البايثون

- Python is a programming language widely used

-البايثون هى لغة برمجة تستخدم على نطاق واسع

- in data science — في علم البيانات
- in machine learning — في التعلم الآلى
- For developing websites and applications — لتطوير المواقع والتطبيقات

- The first version of the language was in 1991.

-أول إصدار للغة البايثون كان في عام ١٩٩١.

Features of Python مميزات لغة البايثون

Key Features of Python

- Libraries — المكتبات
- Open Source — مفتوحة المصدر
- Integration — التكامل
- Interpreted Language — لغة مفسرة
- Easy-to-use language — لغة سهلة الاستخدام
- Versatility — تعدد الاستخدامات

programming language	لغة برمجة	machine learning	التعلم الآلي	key features	مميزات رئيسية

1. Open source: Python is **free** and **open source** ⟶ allowing everyone to use and develop it.

١- **مفتوحة المصدر:** لغة بايثون مجانية ومفتوحة المصدر ⟵ مما يسمح للجميع باستخدامها وتطويرها.

2. Interpreted language:

٢- **لغة مفسرة:**

- Python **translates programming codes** line by line.

- تترجم لغة البايثون الأكواد البرمجية سطرًا بسطر.

- If there are errors in the program code, it will stop working.

- إذا كانت هناك أخطاء في كود البرنامج، فسيتوقف عن العمل.

- Programmers can quickly find errors in the codes.

- يمكن للمبرمجين إيجاد الأخطاء في الأكواد بسرعة.

3. Versatility:

٣- **تعدد الاستخدامات:**

Python can be used in developing
يمكن أن تستخدم لغة البايثون في تطوير

- web applications — تطبيقات الويب
- data science — علوم البيانات
- artificial intelligence — الذكاء الاصطناعي
- machine learning — التعلم الآلي
- game programming — برمجة الألعاب

4. Easy-to-use language: It is one of the easiest programming languages for beginners because of **its simple and organized formula** and **uses words similar to English**, unlike other programming languages.

٤- **لغة سهلة الاستخدام:** تُعد من أسهل لغات البرمجة للمبتدئين بسبب صيغتها البسيطة والمرتبة وتستخدم كلمات تشبه الإنجليزية على عكس لغات البرمجة الأخرى.

5. Integration:

٥- **التكامل**

Python can be

- integrated with other languages such as [C, C++, and Java].
  يمكن دمج لغة البايثون مع لغات أخرى مثل [Java ,C ++ , C]
- used in developing multi-platform programs.
  يمكن استخدامها في تطوير البرامج متعددة الأنظمة.

6. Libraries: Python has many libraries that you can use.

٦- **المكتبات:** تتميز لغة بايثون بتوافر العديد من المكتبات التي يمكنك استخدامها.

programmers	المبرمجين	pre-built	مجهز مسبقًا	beginners	مبتدئين	from scratch	من الصفر
formula	صيغة	effectiveness	فعالية	efficiency	كفاءة		

Python Libraries مكتبات لغة البايثون

- Python libraries are **pre-built codes** and **functions** that help programmers perform specific tasks without having to write codes from scratch.

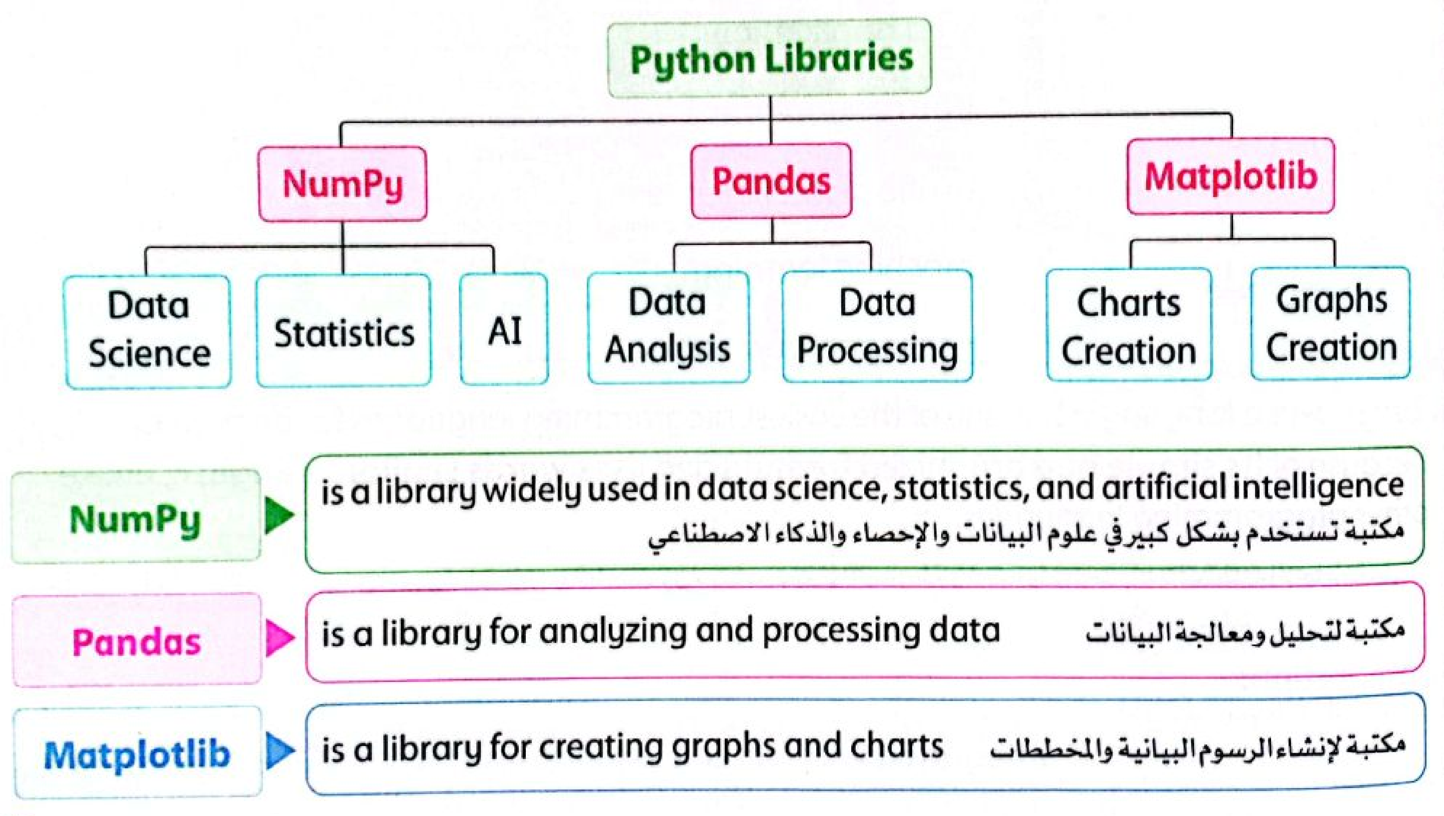
هي مجموعة من الأكواد والوظائف المجهزة مسبقا التي تساعد المبرمجين في أداء مهام محددة دون الحاجة إلى كتابة الأكواد من الصفر.

- Libraries are a powerful tool that increases the **efficiency** and **effectiveness of programming using Python.**

They provide ready-made solutions to many common problems or requirements. like:

تُعتبر المكتبات أداة قوية تزيد من كفاءة وفعالية البرمجة باستخدام بايثون.

توفر حلولًا جاهزة للكثير من المشاكل أو المتطلبات الشائعة مثل :



NumPy	is a library widely used in data science, statistics, and artificial intelligence مكتبة تستخدم بشكل كبير في علوم البيانات والإحصاء والذكاء الاصطناعي
Pandas	is a library for analyzing and processing data مكتبة لتحليل ومعالجة البيانات
Matplotlib	is a library for creating graphs and charts مكتبة لإنشاء الرسوم البيانية والمخططات

Pop Quiz

1. Put (✓) in front of the correct sentence and (✗) in front of the wrong one.

1. Python is used on a small scale (على نطاق ضيق) in data science. ( )
2. Python is easy to use and has an interpreter that translates codes line by line . ( )
3. Python has many libraries that you can use. ( )
4. Matplotlib is a library for analyzing and processing data . ( )

statistics احصاء | graphs رسوم بيانية | artificial intelligence الذكاء الاصطناعي | charts مخططات

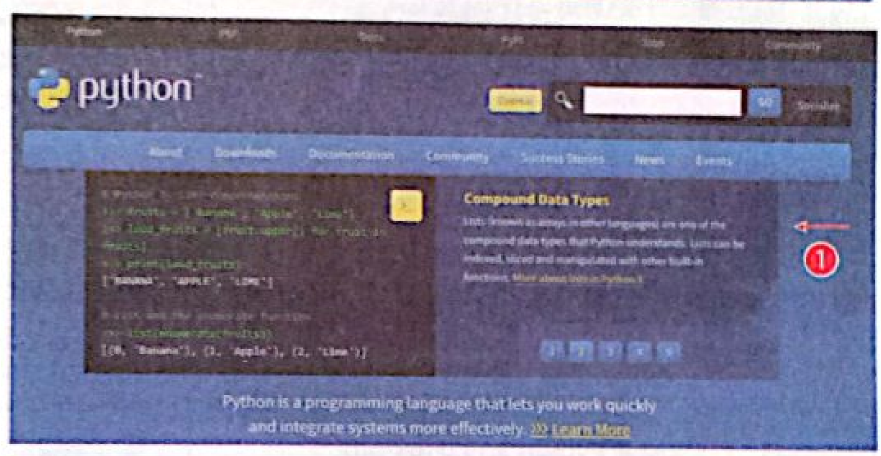
2. Complete the following sentences.

1. "........" is a library for analyzing and processing data.
2. "........" help programmers perform specific tasks without having to write code from scratch.
3. Python is a .... language, so it allows everyone to use and develop them.

How to download the program from the official website كيفية تنزيل البرنامج من الموقع الرسمي

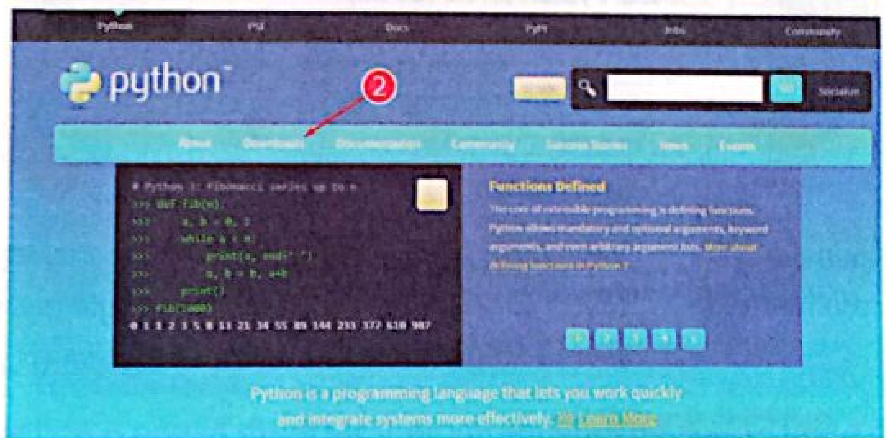
❶ Visit the official Python website www.python.org.

١. قم بزيارة الموقع الرسمي للغة البايثون www.python.org



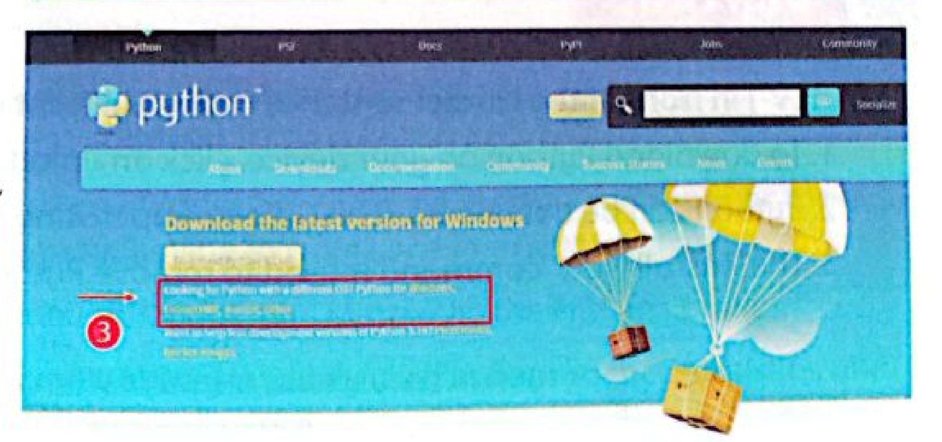
❷ Choose "Download".

٢. اختر "Download".



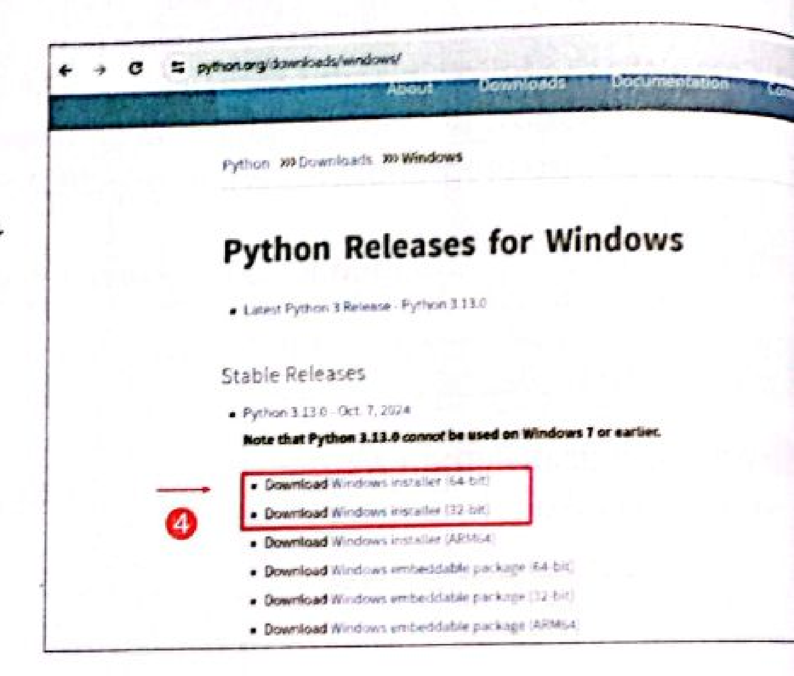
❸ Then choose the system you are working on (Windows, Mac, or Linux).

٣. ثم اختر النظام الذي تعمل عليه (ويندوز، ماك، أو لينكس).



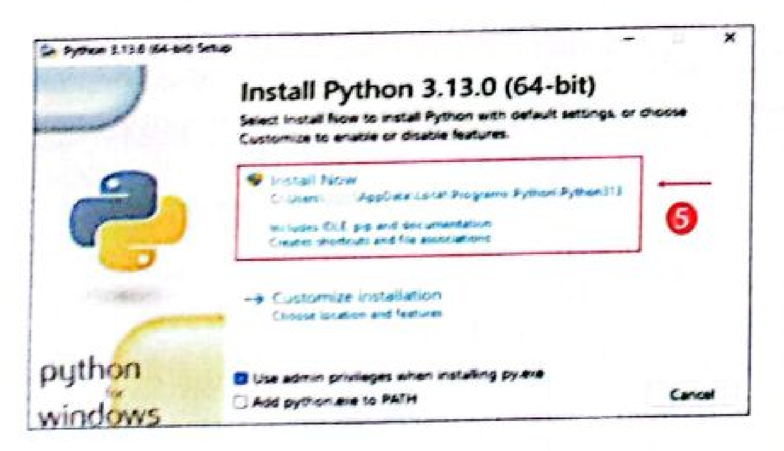
❹ You must choose 64 bit or 32 bit, according to your device specifications.

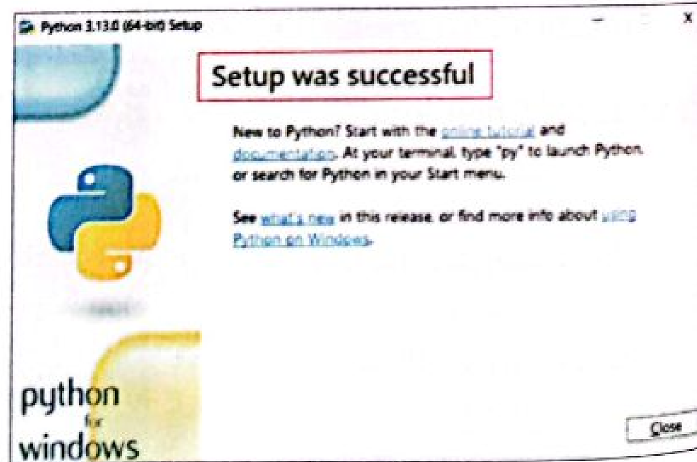
٤. عليك اختيار 64 bit او 32 bit، وذلك بناء على مواصفات جهازك.



❺ After downloading, install the program on your device and follow the instructions.

٥. بعد التنزيل ، قم بتثبيت البرنامج على جهازك واتبع التعليمات.







▶ **Put (✓) in front of the correct sentence and (✗) in front of the wrong one.**

1. To download Python on your device, click on upload. ( )
2. Python can be downloaded on different operating systems. ( )
3. The" Install Now "command is used to remove Python from your device. ( )

specifications مواصفات | install يثبت / تثبيت | instructions تعليمات

Stop here !



استمع إلى ملخص الدرس

نقاط هامة وعبارات استرشادية تمكنك من تلخيص وإتقان الدرس.

Lesson Summary

- Python is widely used in data science, machine learning and websites and applications development.

- لغة البايثون تستخدم على نطاق واسع في علم البيانات والتعلم الآلي ولتطوير المواقع والتطبيقات.

- Python is free and open source so it allows everyone to use and develop it.

- لغة البايثون مجانية ومفتوحة المصدر، مما يسمح للجميع باستخدامها وتطويرها.

- Python is an interpreted language which translates programming codes line by line.

- لغة البايثون هى لغة مفسرة حيث انها تترجم الاكواد البرمجية سطرًا بسطر.

- Python has simple and organized formula and uses words similar to English.

- تتميز لغة البايثون بصيغتها البسيطة والمنظمة وتستخدم كلمات تشبه الانجليزية.

- Libraries are a powerful tool that increases the efficiency and effectiveness of programming using Python.

- تُعتبر المكتبات أداة قوية تزيد من كفاءة وفعالية البرمجة باستخدام بايثون.



How to deal with the exam

كلمات و عبارات إسترشادية تساعدك على حل أسئلة الامتحان.

Topic	Guiding words	Exam items
Principles of Python	easiest - beginners	Python is one of the easiest programming languages for beginners.
	integrated - languages	Python can be integrated with other languages such as C, C++, and Java.
	specific tasks - scratch	Python libraries help programmers perform specific tasks without having to write code from scratch.
	Pandas - libraries	NumPy, Pandas, and Matplotlib are Python libraries.
	NumPy library - artificial intelligence	NumPy library is widely used in data science, statistics, and artificial intelligence.

General Exercises

On Lesson Six





ممتاز ● جيد جدا ● جيد ● غير جيد ●

▸ If you got ● you need to revise the lesson again.

قم بتقييم نفسك بالعلامات الموضحة وإذا حصلت على ● (غير جيد) قم بمراجعة الدرس مرة أخرى من الصفحة السابقة.

El-Moasser Exercises

1 Choose the correct answer from a, b, c or d.

1. One of the advantages of the Python language is that it is ....
   a. easy to use b. hard language
   c. closed-source language d. all of the above
2. Python can be integrated with other languages such as ....
   a. Java b. C++ c. both (a) and (b) d. HTML
3. Python .... increase the efficiency and effectiveness of programming using Python.
   a. graphs b. charts c. games d. libraries
4. .... is a library for analyzing and processing data.
   a. Pandas b. NumPy c. Matplotlib d. Mac
5. Python is a/an .... language as it translates programming codes line by line.
   a. complex b. interpreted c. medical d. industrial

2 Complete the following sentences with the appropriate words in brackets.

(Programming - charts – robots – Versatility)

1. .... is one of the features of Python.
2. Python is one of the easiest .... languages.
3. Matplotlib is a library for creating graphs and ....

3 Put (✓) in front of the correct sentence and (x) in front of the wrong one.

1. Thanks to Python libraries, programmers don't have to write codes for many tasks. ( )
2. Python is suitable for beginners because of its simple and tidy formula. ( )

3. Python libraries provide ready-made solutions to many problems. ( )
4. Pandas library is heavily used in data science, statistics and artificial intelligence. ( )
5. There is no library for data analysis and processing in Python. ( )

Student's Book Exercises

1 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. Python is a free and open-source language, which does not allow anyone to develop it. ( )
2. It is not permissible to create applications and websites in Python. ( )
3. Python uses data science and machine learning. ( )
4. Python is an interpreted language because it translates programming codes line by line. ( )
5. Python is used in developing web applications, data science, artificial intelligence, machine learning, and game programming. ( )
6. Python is one of the most difficult programming languages. ( )
7. Python can be integrated with other languages such as C, C++, and Java. ( )
8. One of the disadvantages of Python is the lack of libraries that you can use. ( )
9. NumPy: is a library used in data science, statistics, and artificial intelligence. ( )
10. Pandas: is a library for analyzing and processing data. ( )

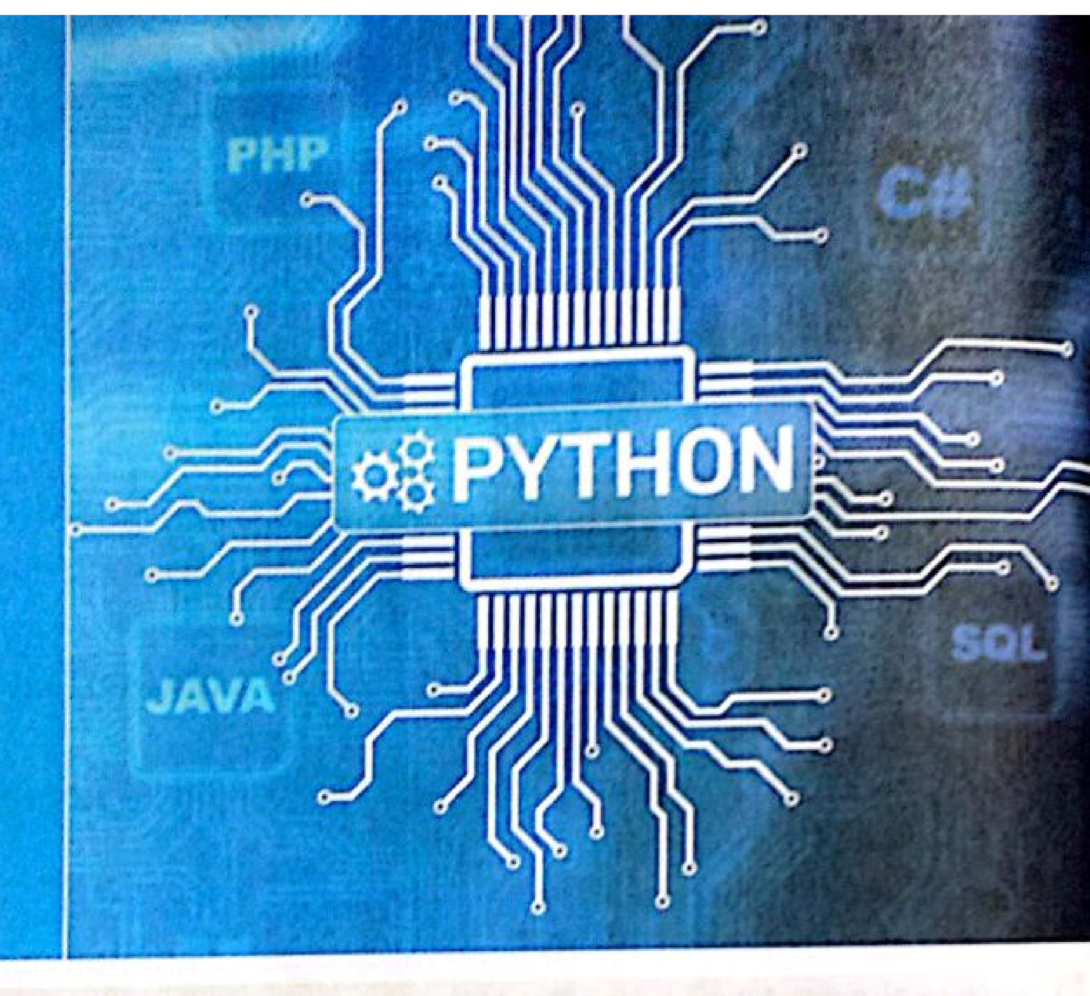
2 Download Python from the official website and arrange the following steps in the correct order.

1. You must choose 64bit or 32bit, depending on your device specifications. (................)
2. Visit the official Python website www.python.org. (................)
3. Choose the system you are working on (Windows, Mac, or Linux). (................)
4. After downloading, install the program on your device and follow the instructions. (................)
5. Choose "Downloads". (................)





Variables in Python



Learn

What are variables

- Variables in programming languages express a reserved place in memory to store and save a specific value, where the value can change.

- المتغيرات في لغات البرمجة تعبر عن مكان محجوز في الذاكرة لتخزين وحفظ قيمة معينة، حيث يمكن للقيمة أن تتغير.

Example

Taher= 20

Variable name	Taher
Variable value	20



Note

The value of the variable can be changed during the execution of the program and according to the code developed by the programmer.

قيمة المتغيريمكن تغييرها أثناء تنفيذ البرنامج وحسب التعليمات البرمجية التي وضعها المبرمج.

Variables	متغيرات	reserved	محجوز	store	تخزين	execution	تنفيذ
programmer	المبرمج						

Conditions for naming variables in Python: شروط تسمية المتغيرات في لغة البايثون

1. The variable name begins with a "**letter**" or an "**underscore** "_".

١. بداية اسم المتغير بحرف أو علامة الشرطة السفلية _.

2. The change name contains "**letters (A-Z)**" or "**numbers**" or an "**underscore**" "_" .

٢. يحتوي اسم التغيير على حروف (A–Z) أو أرقام أو علامة الشرطة السفلية _ .

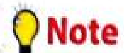
3. Reserved words may not be used in Python because they express specific values that the program understands.

٣. لا يجوز استخدام الكلمات المحجوزة في لغة البايثون لأنها تعبر عن قيم معينة يفهمها البرنامج.

Example

(False) is a reserved word within the program, as it is a word that indicates a reserved value (logical value).

(False) كلمة محجوزة داخل البرنامج فهي كلمة تشير إلى قيمة محجوزة (قيمة منطقية)



Note

When you write a variable name, you must take into account placing the variable names in upper and lowercase letters.

عند كتابتك لاسم متغير يجب أن تراعى وضع أسماء المتغيرات للحروف الكبيرة والصغيرة.

Example

TAHER, Taher, taher, TaheR

The variable names in the example refer to four variables and not one variable.

تشير أسماء المتغيرات في المثال إلى أربع متغيرات وليس متغير واحد.



Pop Quiz

▸ Put (✓) in front of the correct sentence and (✗) in front of the wrong one :

1. Lowercase letters must be considered when naming variables. ( )
2. The variable name can begin with a number. ( )
3. The variable name contains letters only. ( )
4. A variable is a reserved place in memory to store and save a certain value, where the value cannot change. ( )

begin يبدأ | contain يحتوى | indicate يشير

Types of variables in Python أنواع المتغيرات في لغة البايثون

1 Numbers : Used to store numerical values such as integers (int) and decimals (float).

١.**الأرقام:** تستخدم لتخزين القيم العددية مثل الأعداد الصحيحة (int) والأعداد العشرية (float).

Example

X = 5 Y = 10	Integer variables
Z = 5.25 A = 8.32	Decimal variables

2 Strings : Used to store texts such as names and addresses.

٢.**النصوص** : تُستخدم لتخزين النصوص مثل الأسماء والعناوين.

Texts are placed between single quotes ' ' or double quotes " ".

يتم وضع النصوص بين علامات الإقتباس المفردة ' ' أو المزدوجة " ".

Example

Name = "Taher" City = 'Cairo'	Textual variables

3 Booleans : A data type that contains only two values True or False.

٣.**القيم المنطقية**: نوع بيانات يحتوي فقط على قيمتين True أو False.

Often used in comparisons and decision making in codes

تُستخدم غالباً في المقارنات واتخاذ القرارات في الأكواد.

Example

Is_taher_student = False Is_taher_a_teacher = True	Boolean variables

numerical values القيم العددية | decimals اعداد عشرية | comparison مقارنة | data بيانات

Python program interface واجهة برنامج البايثون

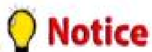
1 Through the interactive Python interface (Python Shell): You can write simple codes and execute them directly to see the results.

١. **يمكنك من خلال واجهة البايثون التفاعلية :** كتابة أكواد بسيطة وتنفيذها مباشرة لرؤية النتائج.

```
Python 3.10 (64-bit)
Python 3.10.4 (tags/v3.10.4:9d38120, Mar 23 2022, 23:13:41) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> print("Hello World")
Hello World
>>>
```

2 Text editor : It allows you to write longer and more complex codes and save them to run later.

٢. **المحرر النصي :** يمكنك من كتابة أكواد أطول وأكثر تعقيدًا وحفظها لتشغيلها لاحقًا.


Notice

- The interactive Python interface is installed when you install the Python language, there is no need to download it.

واجهة البايثون التفاعلية يتم تثبيتها عند تثبيت لغة البايثون ولا يوجد حاجة إلى تنزيلها.

- Unlike a text editor that must be downloaded from the Internet, such as Visual Studio and PyCharm.

بعكس المحرر النصي الذي يجب ان يتم تنزيله من على الإنترنت مثل Visual Studio و PyCharm.



Pop Quiz

▶ **Complete the following sentences with the appropriate words in brackets.**

(two values - text editor - Booleans)

1. .... , numbers, and strings are of variables.
2. Boolean values consist of ....
3. .... enables you to write, save, and run longer and more complex codes later.

interactive	تفاعلية	codes	أكواد	directly	مباشرة
results	نتائج	install	يثبت	editor	محرر

type ( ) function

▶ To know the type of the variable you can use the type ( ) function

نستخدم الدالة ( ) type لمعرفة نوع المتغير.

```
Python 3.10 (64-bit)
Python 3.10.4 (tags/v3.10.4:9d38120, Mar 23 2022, 23:13:41) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> X = 5
>>> Y= 10
>>> Z = 5.25
>>> A = 8.32
>>> name = "Taher"
>>> city = 'Cairo'
>>> type (X)
<class 'int'>
>>> type (Y)
<class 'int'>
>>> type (Z)
<class 'float'>
>>> type (A)
<class 'float'>
>>> type (name)
<class 'str'>
>>> type (city)
<class 'str'>
>>>
```

▶ Simple Python Code Using Variables

كود بسيط على لغة البايثون باستخدام المتغيرات.

```
Python 3.10 (64-bit)
Python 3.10.4 (tags/v3.10.4:9d38120, Mar 23 2022, 23:13:41) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> name = "Omar"
>>> address = "Cairo, Egypt"
>>> age = 13
>>> print ("My name is", name)
My name is Omar
>>> print ("I live in", address)
I live in Cairo, Egypt
>>> print ("I am", age)
I am 13
>>>
```

print ( ) function

- The print function ( ) in Python is one of the most commonly used functions.

- دالة ( ) print في بايثون هي واحدة من أكثر الدوال استخداما.

- It is used to display text or values on the output screen.

- تُستخدم لعرض النصوص أو القيم على شاشة الإخراج.

- It can be used to display text, variables, or even the results of mathematical operations.

- يمكن استخدامها لعرض النصوص، المتغيرات، أو حتى نتائج العمليات الحسابية.

display	يعرض	mathematical	حسابية	operations	عمليات
text	نصوص	screen	شاشة		

Stop here !





استمع إلى ملخص الدرس

نقاط هامة وعبارات استرشادية تمكنك من تلخيص وإتقان الدرس.

Lesson Summary

- Variables in programming languages are for a reserved place in memory to store and save a certain value, where the value can change.

  - تعبر المتغيرات في لغات البرمجة عن مكان محجوز في الذاكرة لتخزين وحفظ قيمة معينة، حيث يمكن للقيمة أن تتغير.
- The conditions for naming variables is that they begin with a letter or an underscore.

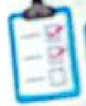
  - من شروط تسمية المتغيرات أنها تبدأ بحرف أو علامة الشرطة السفلية.
- The variable name can contain the letters A-Z and numbers in addition to the underscore, and reserved words are not used.

  - يمكن أن يحتوي اسم المتغير على الحروف A-Z والأرقام بالإضافة على الشرطة السفلية، وألا يتم استخدام كلمات محجوزة.
- You must consider letter case to place variable names.

  - يجب مراعاة حالة الأحرف عن وضع أسماء المتغيرات.
- Numbers used to store numerical values such as integers (int) and decimals (float).

  - تستخدم الأرقام لتخزين القيم العددية مثل الأعداد الصحيحة (int) والأعداد العشرية (float).
- The interactive Python interface is installed when Python is installed.

  - واجهة البايثون التفاعلية يتم تثبيتها عند تثبيت لغة البايثون.



How to deal with the exam

كلمات و عبارات إسترشادية تساعدك على حل أسئلة الامتحان

Topic	Guiding words	Exam items
Variables in Python	reserved words - specific values	Reserved words may not be used in Python because they express specific values that the program understands.
	strings - addresses	Strings are used to store texts such as names and addresses.
	editor - complex	Text editor allows you to write longer and more complex codes.
	codes - results	You can write simple codes and execute them directly to see the results through Python shell.
	booleans - values	Booleans are a data type that contains only two values.

General Exercises

On Lesson Seven





ممتاز | جيد جدا | جيد | غير جيد

▶ If you got 🔴 you need to revise the lesson again.

قم بتقييم نفسك بالعلامات الموضحة وإذا حصلت على 🔴 (غير جيد) قم بمراجعة الدرس مرة أخرى من الصفحة السابقة.

El-Moasser Exercises

1 Choose the correct answer from a, b, c or d.

1. Textual variables can store ....
   - a. strings
   - a. boolean
   - c. numbers
   - d. none of the above
2. .... function is used to display text or values on the output screen.
   - a. Type ( )
   - b. print ( )
   - c. Input ( )
   - d. output ( )
3. Through................ the codes are written, saved and later executed.
   - a. browser
   - b. text editor
   - c. photoshop
   - d. paint
4. The function "................" is used to know the variable type.
   - a. type ( )
   - b. print ( )
   - c. input ( )
   - d. output ( )

2 Complete the following sentences with the appropriate words in brackets.

(interactive Python interface – underscore – strings – Booleans)

1. .... are a type of variable that takes values true or false.
2. The .... is installed when Python is installed.
3. The variable name begins with a letter or an ....

3 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. A variable is an unreserved place to store fixed values that cannot be changed. ( )
2. When naming a variable you must start with a number. ( )
3. Variable values can be changed by code. ( )
4. Reserved words may be used in Python because they express certain values that the program understands. ( )
5. Boolean values take values (3 – 4 – 5). ( )
6. The use of uppercase and lowercase letters can be ignored when naming a variable. ( )

Student's Book Exercises

1 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. Variables in programming languages are a reserved place in memory to store and save a specific value. ( )
2. The variable name must not begin with a letter or an underscore sign _. ( )
3. TAHER, Taher, taher, TaheR are 4 names for variables in the Python language. ( )
4. The change name contains letters (A-Z) , numbers or an underscore sign _. ( )
5. When naming variables, reserved words in the Python language may be used. ( )
6. Y= 10 The statement type of the variable Y is numeric for an integer. ( )
7. City = "Cairo" The statement type of the variable City is text. ( )
8. Is_taher_student = False The statement type of the variable Is_taher_student is logical. ( )
9. To know the type of the variable, we do not need to use the type ( )function. ( )
10. The texts of variables are placed between single quotation marks ' 'or double quotation marks " ". ( )

2 Choose the correct answer from a, b, c or d.

1. The function .... is used to display texts or values on the output screen

   a. Cos( ) b. Type( ) c. Print( ) d. Sin( )

2. The text value of the variable is placed between the signs ....

   a. "" b. <> c. >= d. =<

3. To display texts, variables, or even the results of mathematical operations, we use the function ....

   a. Cos( ) b. Type( ) c. Print( ) d. Sin( )

4. To know the type of variable statement, we use the function ....

   a. Cos( ) b. Type( ) c. Print( ) d. Sin( )



Revision

on Lessons 5,6 & 7

مراجعة عامة على الدروس الخامس والسادس والسابع في ورقة واحدة



Lesson 5 : Sprites Area in Scratch

1 Sprites Area

- It has sprites used in the project.
- It contains :

1. The name of the sprite (and you can modify it).
2. The location of the sprite is determined on the horizontal X and vertical axes Y
3. The direction of movement of the sprite can be controlled.
4. The sprite can be shown and hidden on the stage.
5. The possibility of controlling the size of the sprite on the stage.
6. Add and delete sprites.

2 Add an object on the platform

- Click on the Choose Sprite icon
- Choose the desired sprite and it will be inserted directly on the stage.
- More than one sprite can be inserted on the stage in the same way.
- The sprite can be deleted by clicking on the delete icon located at the top of the object in the sprites area.
- To move the sprite, the commands in the Motion group are used, and for execution we use the When Clicked command
- To add a background, we use the command choose a backdrop.

Lessons 6 and 7 : Principles of Python and Variables in Python

1 Learn about Python

- Python is widely used in data science and machine learning.
- Python is an open source, interpreted, versatile and easy to use language.
- One of the most popular libraries is NumPy and is used in data science and statistics, Pandas for data analysis, and Matplotlib for creating drawings and diagrams.

2 Variables and their types

- Variables in programming languages express a reserved place in memory to store and save a specific value.
- Numbers, strings and booleans are types of variables in Python.
- The variable name in Python should begins with a letter or an underscore.
- When writing a variable name, you must take into account placing the variable names in upper and lowercase letters.
- Booleans are a data that contains only two values True or False.

Accumulative Test

On Lessons 5,6&7



اختبار تراكمي على الدروس الخامس والسادس والسابع

1 Choose the correct answer from a, b, c or d.

1. In the Scratch program, the name of the sprite ....
   a. can be modified
   b. cannot be modified
   c. only part of the name can be modified
   d. none of the above
2. In the sprites area, you can ....
   a. show the sprite
   b. hide the sprite
   c. delete the sprite
   d. all of them
3. The function "................" is used to display text or values on the output screen.
   a. type ( )
   b. print ( )
   c. input ( )
   d. output ( )
4. We use .... in writing commands in Python.
   a. paint
   b. access
   c. editor
   d. arithmetic functions
5. Libraries are a powerful tool that increases .... when using Python.
   a. programming efficiency
   b. programming effectiveness
   c. both a and b
   d. none of the above
6. The value of the text variable is enclosed in ....
   a. " "
   b. < >
   c. > =
   d. <=

2 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. Python is a language used to write, format, and print text. ( )
2. The sprites area does not have sprites used in the project. ( )
3. Python is one of the easiest programming languages for beginners because of its simple and tidy formula. ( )
4. Constants are reserved places in memory to store and save a particular value, where the value can change. ( )
5. Booleans are a data type that contains only two values of True or False. ( )
6. The direction of movement of the object on the stage can be controlled. ( )

يمكنك المراجعة باستمرار (تراكمية)
من خلال الصفحة السابقة.



Part 2

El-Moasser Interactive Notebook

Contents

1. Monthly Assessments 105
2. Three days are enough 107
3. A day is enough 135
4. Sample Tests 152
5. Answers of The Main Book 162





Monthly Assessments

التقييمات الشهرية

February Test

1 Choose the correct answer from a, b, c or d.

1. .... is one of the roles that the personal assistants like Alexa, Siri do.
   a. Performing surgery
   b. Understanding sound command and perform it
   c. Creating computer programs
   d. Learning languages

2. Sensors sense changes in the surrounding environment and convert it to .... so that machines and devices can understand them and make appropriate decisions.
   a. data
   b. information
   c. knowledge
   d. signals

3. The robot structure may be made of ....
   a. metal
   b. plastic
   c. carbon
   d. all of them

4. LEGO Mindstorms robot is considered .... robots.
   a. medical
   b. educational
   c. industrial
   d. agriculture

2 Put (✓) in front of the correct sentence and (x) in front of the wrong.

1. Narrow AI focuses on performing a specific task such as recognizing faces or translating language. ( )
2. Super AI is the most advanced and it can solve problems that are difficult for humans to solve easily. ( )
3. Doctors use artificial intelligence to help them diagnose and treat diseases relatively slow. ( )
4. Natural Language Processing (NLP) means understanding written and spoken human language. ( )

3 Complete the following sentences with the appropriate words in brackets.

(Smart games – Distance sensors – Deep learning – signal conversion)

1. .... aims to enable computer systems to learn complex tasks in a way similar to the way humans learn.
2. .... are from artificial intelligence applications.

3. Sensors work through 3 steps; they are sensing , transmission and ....
4. .... devices measure distance between the robot and surrounding obstacles.

March Test

1 Put (✓) in front of the correct sentence and (x) in front of the wrong one.

1. High accuracy in performing various tasks is one of the features of the robots. (
2. Robots are divided into two types only, they are industrial and educational. (
3. Industrial measurement systems are from laser rangefinders examples. (
4. Controller is considered the robot "brain". (

2 Complete the following sentences with the appropriate words in brackets.

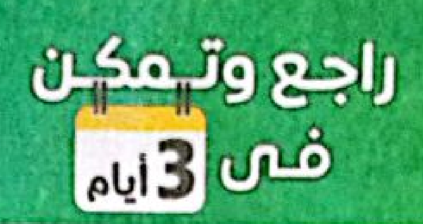
(sound waves – Infrared sensors – Remote controls – microphone)

1. .... is from electronic devices which uses sensor devices.
2. Ultrasonic sensors emit ....
3. .... emit infrared rays then receive the returning rays after they bounce off the object.
4. Phone .... is a sound sensor device that convert the sound you pick up into electrical signals that can be understood by the phone.

3 Choose the correct answer from a, b, c or d.

1. .... is a group of small sensors that sense where your finger touches the screen
   a. Touch screen
   b. Motion sensor device
   c. Phone microphone
   d. Computer screen
2. The second step in sensor work steps is ....
   a. transmission (send signals to another device)
   b. converting signals to another electric signals
   c. taking decisions based on the sensed information
   d. sensing changes in the environment
3. .... is from robot components.
   a. Software b. Sensors c. Power source d. All of them.
4. Software includes .... that determine how the robot responds to information it receives form sensors.
   a. structure b. algorithms c. motors d. drawings

Three days are enough



Day 1 Important Points

1 Artificial intelligence Applications

▸ Types of Artificial intelligence are :

1. **Narrow AI** : which performs a specific task such as recognizing faces and translating languages.
2. **General AI (GAI)** : is more advanced and can perform any task that a human can do.
3. **Super AI (SAI)** : is the most advanced. It can solve problems that are difficult for humans. It discovers new things that we have never imagined before.

2 Artificial intelligence fields

1. Machine Learning : which means learning from mistakes.
2. Natural Language Processing : It is an intelligent language. It understands written and spoken human language.
3. Computer Vision : AI can look at a picture and tell you everything in it.
4. Robotics : Smart robots perform complex and precise surgery, they have ability to work with great accuracy even in environments that are dangerous to humans.
5. Expert Systems : Simulation of human thinking and decision-making.
6. Deep Learning : Simulation of human learning using neural networks.

3 Teachable Machine

▸ is an easy tool that helps you create models to recognize images, sounds, and movements.

4 Sensors

▸ They sense changes in the surrounding environment and convert them into signals.

5 Sensors work through 3 main steps

- **Step 1 :** (Sensing) sensors capture information from the surrounding environment such as (heat, light or sound).
- **Step 2 :** (Signal conversion) converts information to electrical signals that can be read by electronic devices.
- **Step 3 :** (Transmission) of Signals are sent to other devices to display results or perform specific action.

6 The importance of sensors for robots

- They enable robots to interact with their environment to avoid obstacles, recognize sounds and adapt to changes in lighting.

7 Types of robotic sensors

1. **Distance sensors :** They measure distance between robot and surrounding obstacles. They help robot avoid collisions.
2. **Light sensors :** They are used in robots that placed where light is variable and they help robots to adapt to changing of light conditions.
3. **Sound sensors :** They are used in robots that react to sounds.
4. **Motion sensors :** They detect movement and changes in direction. These sensors help the robot to interact with surrounding objects.
5. **Special sensors :** like temperature and humidity sensors.

8 Types of distance sensors and examples of them

1. **Ultrasonic sensors :** Examples : vacuum cleaner robots, parking systems, fluid levels.
2. **Laser rangefinders :** Examples (3D laser scanners, ground scanning systems, industrial measurement systems).
3. **Visible light sensors :** Examples (self-driving car cameras, industrial vision systems, augmented reality systems).
4. **Infrared sensors :** Examples (remote controls, non-contact thermometers).
5. **Time of flight sensors :** Examples (3D sensors, motion tracking systems).

9 Factors for choosing the right sensor type

1. **Required range** → the maximum distance that the device must measure.

2. **Required accuracy** → the required measurement accuracy.
3. **Operating environment** → the environmental conditions in which device will operate in (light, temperature, humidity).
4. **Cost** → the cost of the device and installation.

10 Types of robots

1. **Industrial robots** → are used in factories, perform work with high accuracy in production lines quickly.
2. **Home robots** → clean houses.
3. **Medical robots** → help doctors perform surgeries.
4. **Educational robots** → teach students how to program and technology.

11 Robot components

1. **Structure** → is the main part that carries all the components of the robot, can be made of different materials like (metals, plastic or carbon) and its design affects the weight of robot and its ability to move.
2. **Sensors** → are the senses of a robot. The robot uses them to pick up information from its surroundings (like sound sensors, cameras, temperature, motion).
3. **Motors** → are the robot industrial muscles. The types of motors are (electric motors and air motors).
4. **Controller** → is the "brain" of robot, processing the data collected by sensors and issuing commands to the motors.
5. **Power source** → can be batteries, solar cells or direct power.
6. **Software** → includes algorithms that determine how the robot responds to information it receives from sensors.
7. **Communication tools** → Robots use them to interact with users or other robots, they can be (Bluetooth, Wifi, other techniques).

12 Scratch program

- is a free educational tool designed to teach the basics of programming in a visual and fun way without the need to write complex codes.
- is based on a simple interface.
- used to create projects such games and comics.

- allows students to be creative while learning in a visual and enjoyable way without writing complex codes.

It is a programming language widely used in data science and machine learning and for developing websites and applications.

13 Features of Python language

1. Free and open source which allows everyone to use and develop it.
2. **Interpreted language :** It translates programming codes line by line, so if there are errors in the program code, it will stop working, as programmers can quickly find errors and correct it.
3. **Versatility :** It can be used to develop web applications, data science, artificial intelligence, machine learning, and game programming.
4. **Easy - to - use language :** It is one of the easiest programming language for beginners because it uses words similar to English.
5. **Integration :** It can be integrated with other languages as c, c ++, and Java.
6. **Libraries :** It has many libraries that you can use.

14 Conditions for naming variables in Python

1. The variable name begins with a letter or an underscore.
2. The change name contains letters (A - Z) or numbers or an underscore.
3. reserved words may not be used in naming.

15 Types of variables in Python

1. **Numbers :** store numerical variables such integers (int) and decimals (float).
2. **Strings :** store texts such as names and addresses, texts are placed between single quotes ' ' or double quotes " ".
3. **Booleans :** a data type that contains only two values True or False.

Day 2 Important Definitions

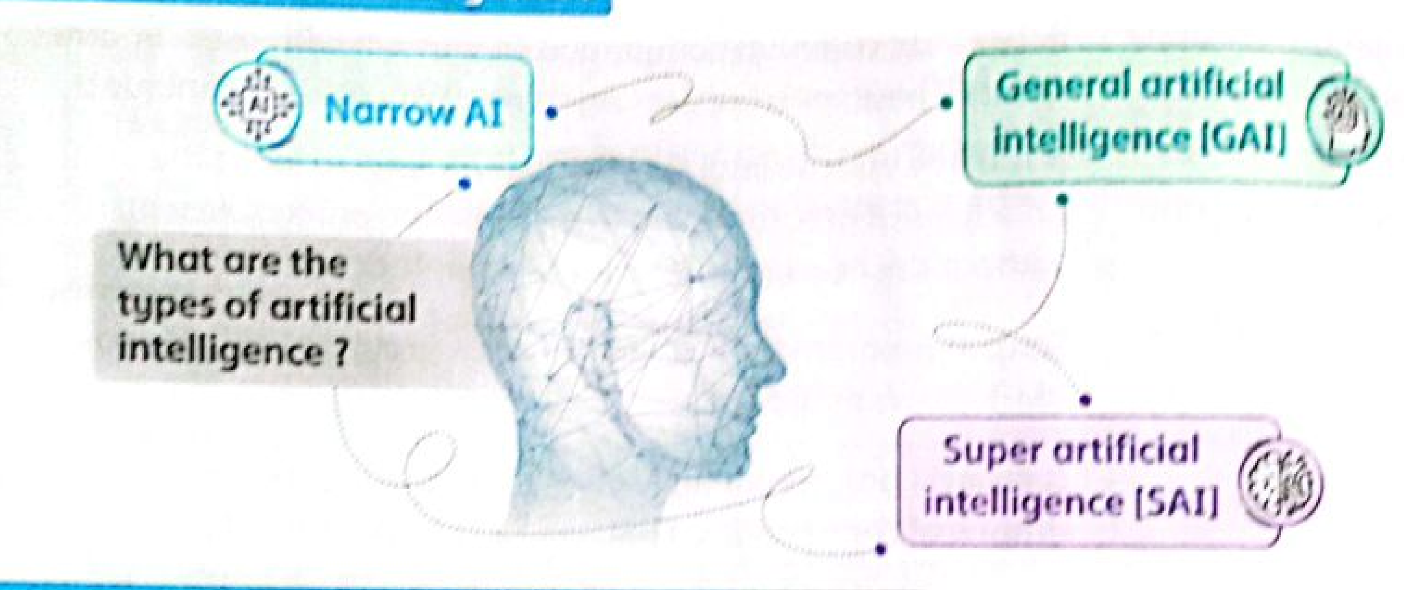
Word	Definition
Narrow AI	It is a specialized type of AI for a specific task such face recognition or language translation.
General AI (GAI)	This type is more advanced, can perform any task that a human can do like thinking solving problems and learning.
Super AI (SAI)	It is the most advanced type, it can solve problems that are difficult for humans to solve.
Personal assistant	It uses artificial intelligence to understand your commands and perform them.
Smart games	They use artificial intelligence to make games more fun and challenging and characters in game learn from their mistakes to become smarter.
Smart cars	The smart car is a car driving itself without a driver using artificial intelligence.
Digital Doctors	Doctors use artificial intelligence to help them diagnose and treat diseases faster and more accurate.
Instant translator	Artificial intelligence can translate words and sentences instantly, making it easier for people to communicate.
Smart shopping	Artificial intelligence analyzes your previous purchasing behavior and offers you suggestions for products that you may like.
Machine Learning	Artificial intelligence learns from mistakes and experiences to be more smarter.
Natural Learning Processing	Artificial intelligence is like an intelligent language translator as it understands written and spoken human language.
Expert systems	Artificial intelligence can solve complex problems and make decisions.

Word	Definition
Deep learning	Artificial intelligence learns very quickly. It relies mainly on neural networks.
Sensors	They are devices that sense changes in the surrounding environment and convert them into signals, so that machine or device can understand them and make appropriate decisions, they are considered the eyes and ears of machine.
Ultrasonic sensors	They measure distance using sound waves. Examples (vacuum cleaner robots, parking systems).
Laser Rangefinders	They measure distance using laser beam. Examples (3 D laser scanners, ground scanning systems industrial measurement systems.
Visible light sensors	They analyze and determine images like (self - driving car cameras, industrial vision systems, augmented reality systems).
Infrared sensors	These devices emit infrared rays for object detection. Examples (remote controls, Non - contact thermometers).
Time of flight sensors	They measure distance using light pulses. Examples (3 D sensors - motion tracking systems)
Robot	It is a device that can be programmed to perform a set of a specific tasks automatically.
Structure	It is the main part of the robot that carries all the components.
Sensors	They are the senses of a robot that robot use them to pick up information from its surroundings.
Motors	They are the industrial muscles of robots. Robots use them to move and execute commands.
Controller	It is the "brain" of the robot that processes the data collected by sensors and issues commands to motors.
Power source	Energy sources for robots, can be batteries, solar cells or direct electric power.

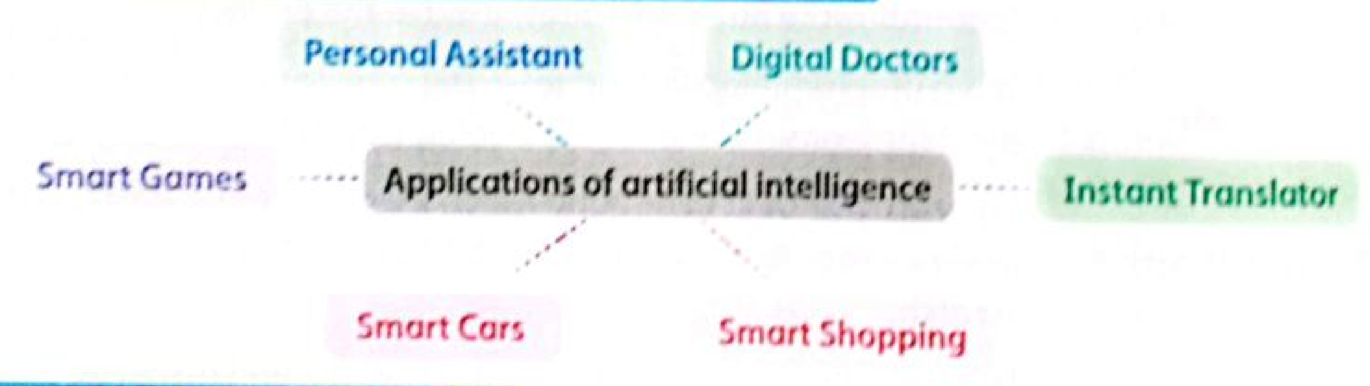
Word	Definition
Software	Software includes algorithms that determine how the robot responds to information it receives from sensors.
Communication tools	Robots use communication tools to interact with users or other robots. These tools can be (Bluetooth, Wifi, other techniques)
Scratch program	It is a free educational tool for the students to learn the principles of programming in a visual and enjoyable way without the need to write a lot of complex codes.
Command Blocks Area	Scratch program area which contains groups of commands block to use in project.
Script Area	It collects programming sections "composing a group of graphical commands called blocks in a specific order".
Stage Area	It shows the result of the work or project.
Sprites Area	It contains the objects (sprites) used in the project.
Python	It is a programming language widely used in data science and machine learning, and for developing websites and applications.
Python libraries	They are pre-built codes and functions that help programmers perform specific tasks without having to write codes from scratch.
NumPy	It is a library used in data science, statistics and artificial intelligence.
Pandas	It is a library used for analyzing and processing data.
Matplotlib	It is a library used for creating graphs and charts.
Python Shell	It is Python interactive interface
Text Editor	It allows you to write longer and more complex codes and save them to run later.
type ( )	It is used to know the variable type.
print ( )	It is used to display text or values on the output screen.

Day 3 Tools and programs that are used in Computer & Information and Communication Technology

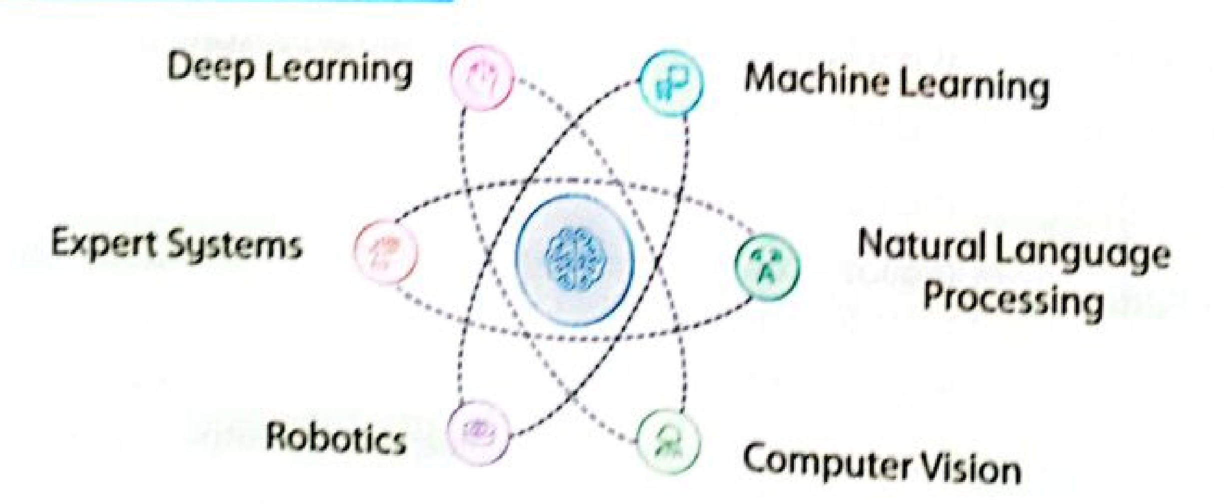
Types of Artificial Intelligence :



Applications of artificial intelligence in daily life :



Artificial Intelligence Fields :



Teachable Machine

- It is an easy-to-use tool that helps you create intelligent models to recognize images, sounds, and movements.

1 Click on the following link to enter the website https://teachablemachine.withgoogle.com/"

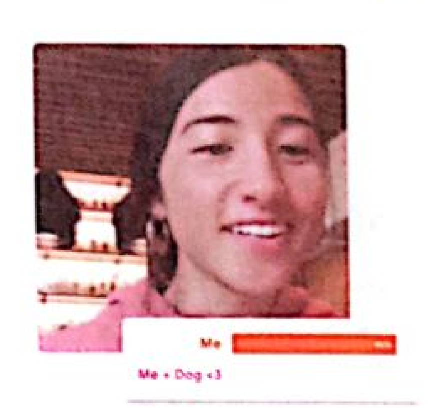
Website login window layout : شكل نافذة الدخول للموقع



Teachable Machine

Train a computer to recognize your own images, sounds, & poses.

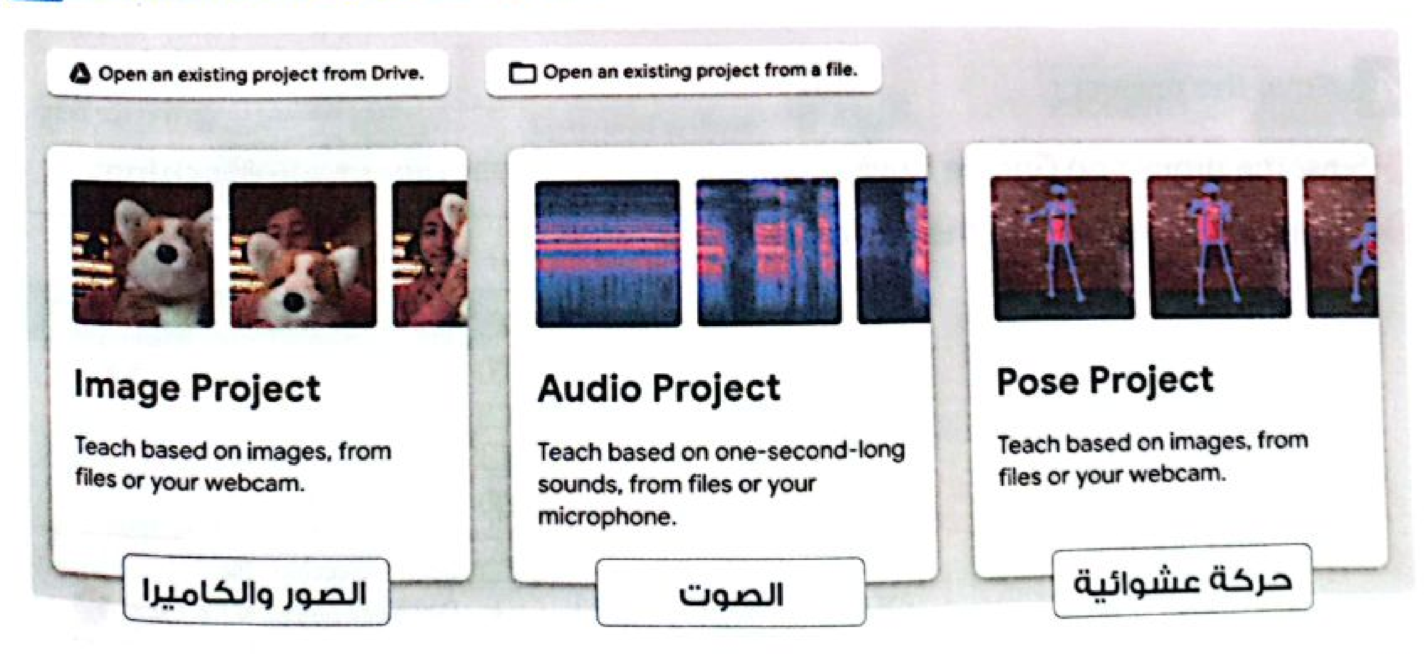
A fast, easy way to create machine learning models for your sites, apps, and more – no expertise or coding required.



Click here to enter the site.

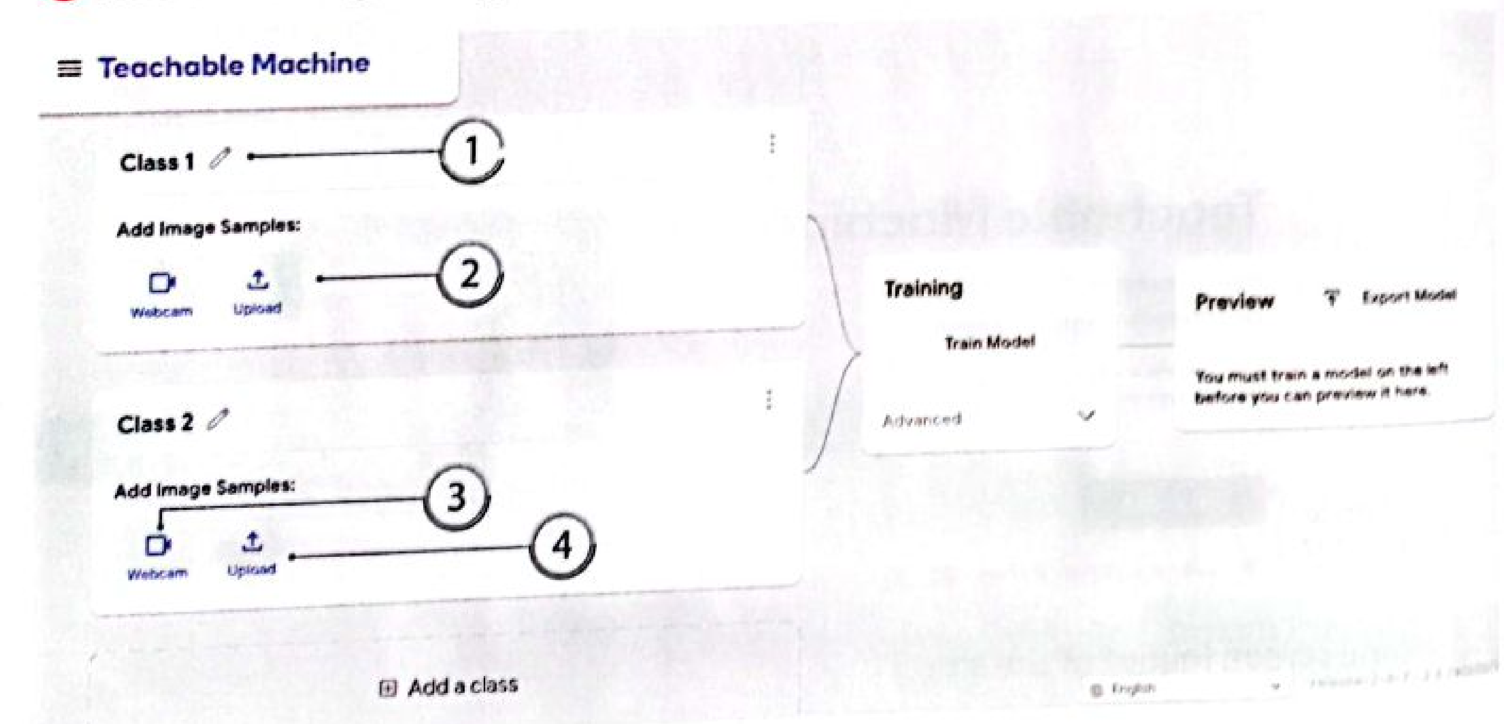


2 Home screen layout of the site :



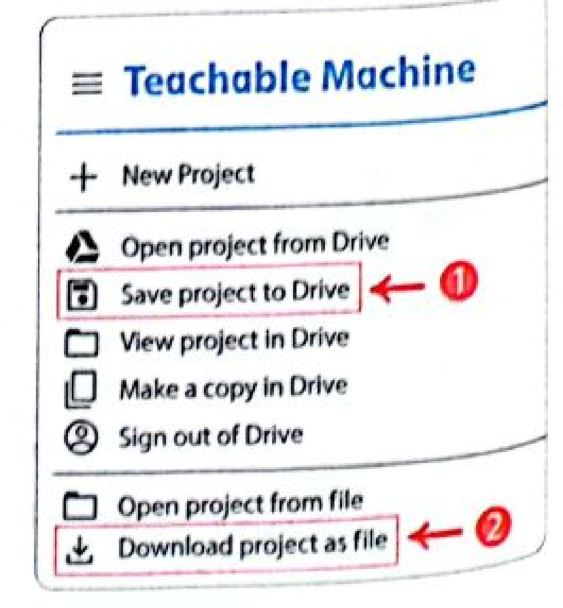
3 Classification that includes a group of images.

1. Upload images of numbers in (Class 1).
2. Open the camera, prepare images of numbers on paper boards" and have the model take them in (Class 2).
3. The artificial intelligence model is trained on the image categories.
4. Add more image categories.



4 Save the project :

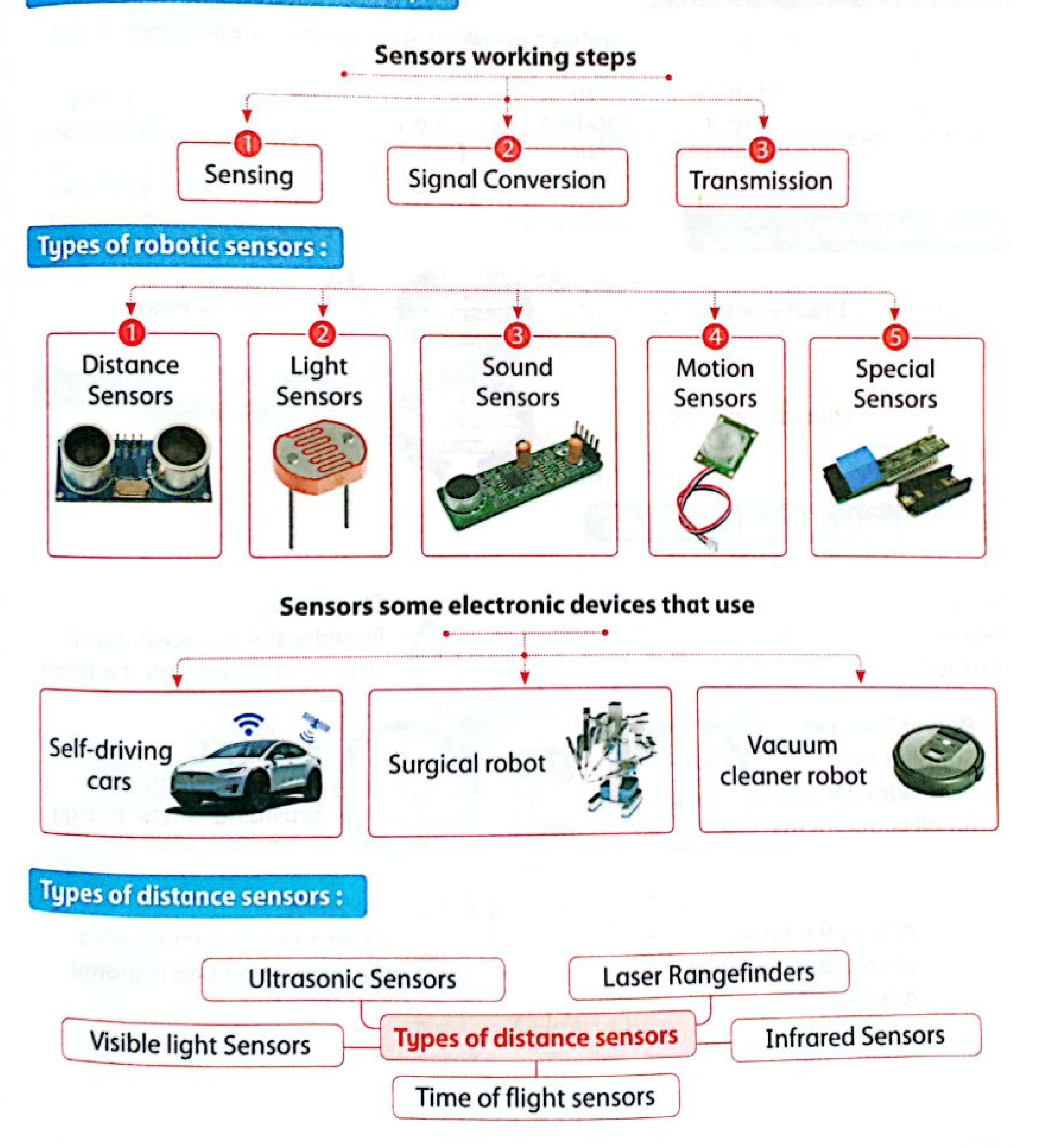
1. Save the project on Google Drive....
2. Download the project to the device...



Sensors work through 3 main steps :

Types of robotic sensors :

Types of distance sensors :



Daily applications of sensors:

- In smartphones
- Motion sensor in games
- In modern cars
- In smart homes
- Touch screen
- Phone microphone

Types of Robots أنواع الروبوتات

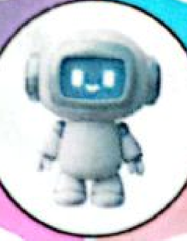





- Industrial robots
- Medical robots
- Educational robots
- Home robots

Components of Robot Operation






Software
Provides the necessary instructions and operations

Structure
Provides the framework and structural support for the robot

Power Sources
Supplies the necessary energy for all components

Actuators
Enable movement by providing kinetic energy

Control Unit
Acts as the brain, coordinating various functions

Sensors
Collect environmental data for interaction and response

Communication tools :

- Robots use **communication tools** to interact with users or other robots.

Communication tools can include

Bluetooth
Short range, Low energy consumption

Wi-fi
Long range, high data transfer rate

Other techniques
(Other communication technologies) Depending on specific requirements

Understanding robot engines

cameras

motion sensors

temperature sensors

Linear motion

Electric motors

Circular motion

Air motors

Jobs
- Data processing
- Issue commands

Control unit

Types
- Simple electronic circuits
- Complex minicomputers

Energy sources for robots

Direct energy

Batteries

Solar cells

Robotics applications

- Industry
- Healthcare
- Education
- Agriculture

Scratch program

Scratch program includes

- games
- animations
- comics
- music
- simulations
- interactive games

Scratch program features :

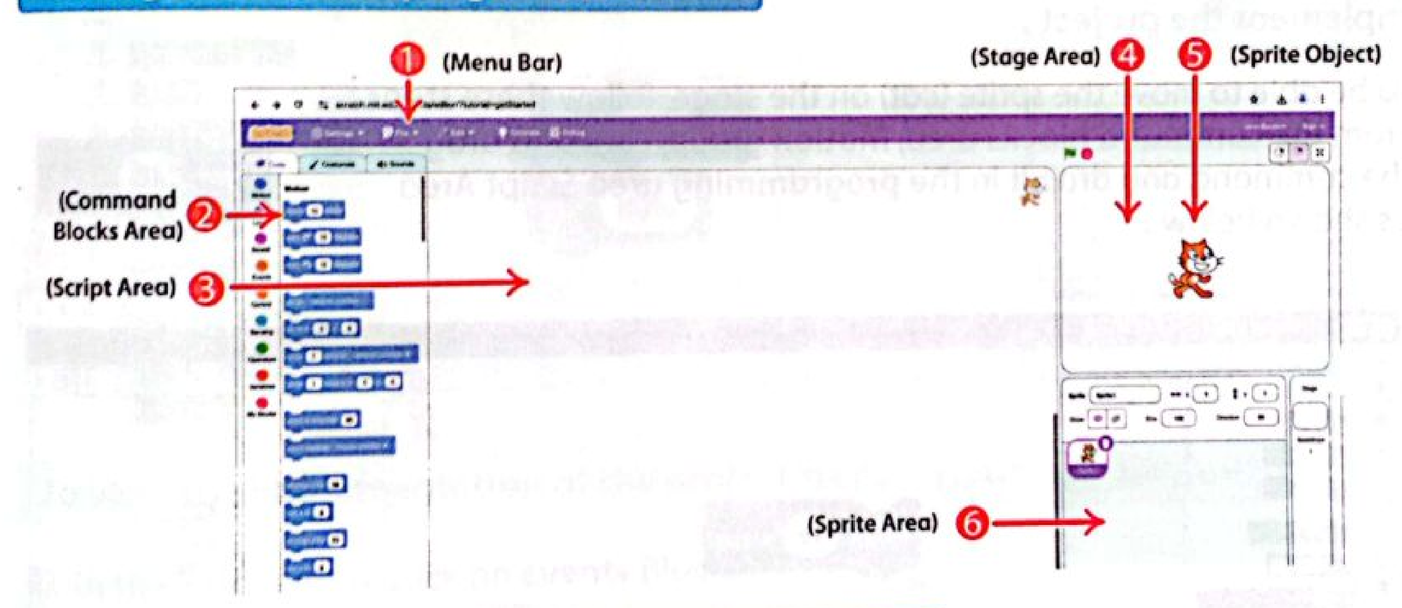
Scratch program features:

- Educational program
- Free program
- Developing creative thinking
- Enhancing problem-solving skills
- Developing Collaboration Skills
- An exciting start to the world of programming
- Sharing the project
- Simple interface

Download the program :

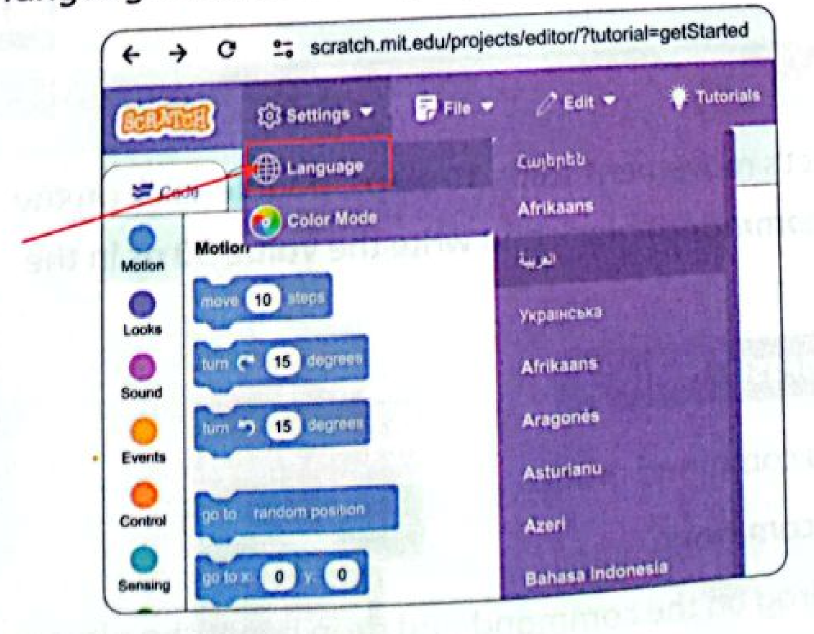
- Through the following website https://scratch.mit.edu/download, the Scratch program is downloaded.

Getting to know the program interface :

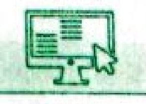


Changing the language of the program interface :

- Try to change the language of the Scratch program interface to Arabic.





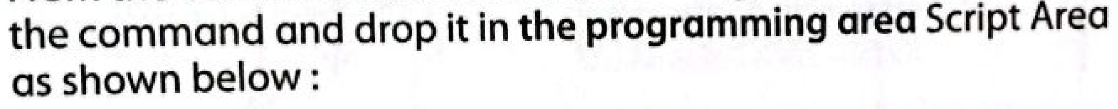


Projects on scratch program

Project :

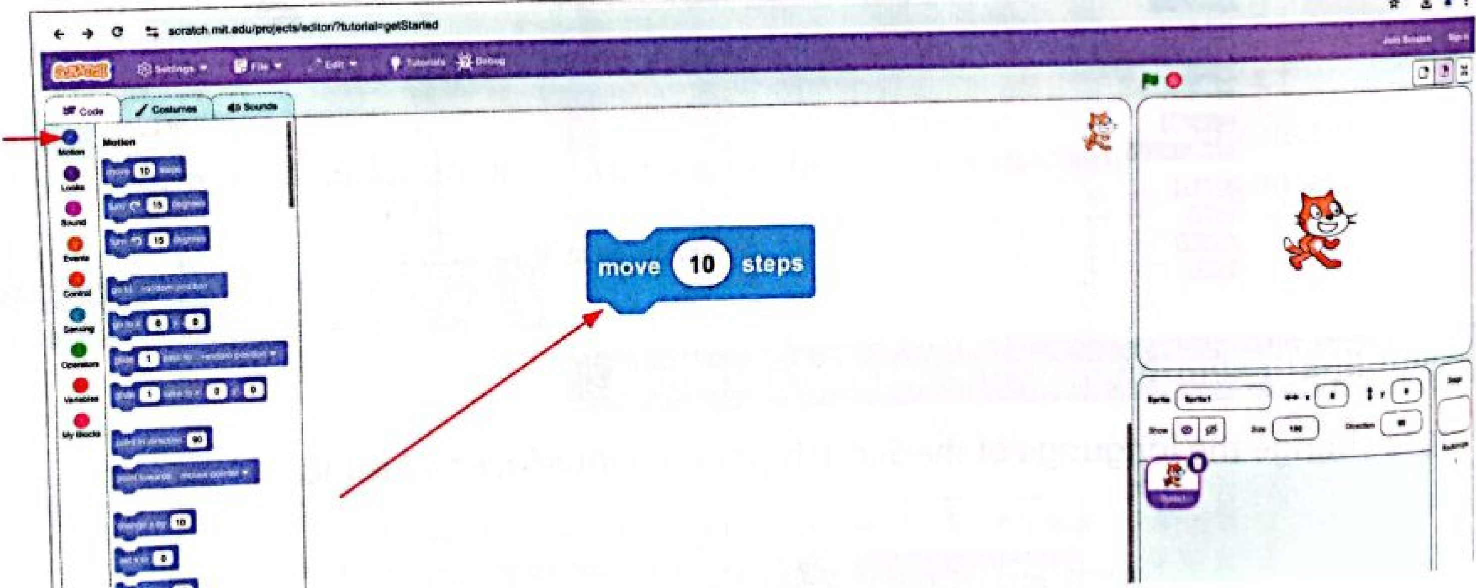
- Move the sprite (**cat**) on the platform or stage **"30 steps"**.
- Then the phrase **"Good morning"** appears.

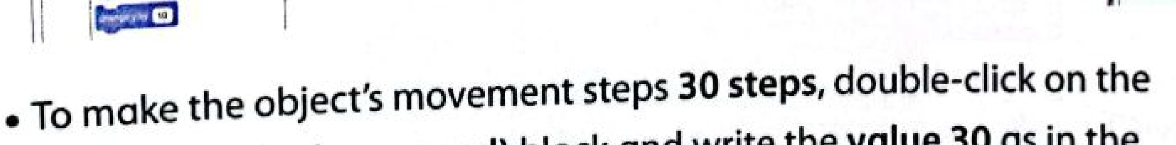
Implement the project :



- To be able to move the sprite (cat) on the stage, follow these steps :
- From the **command blocks** area, **Motion** group, click and drag the command and drop it in **the programming area** Script Area as shown below :





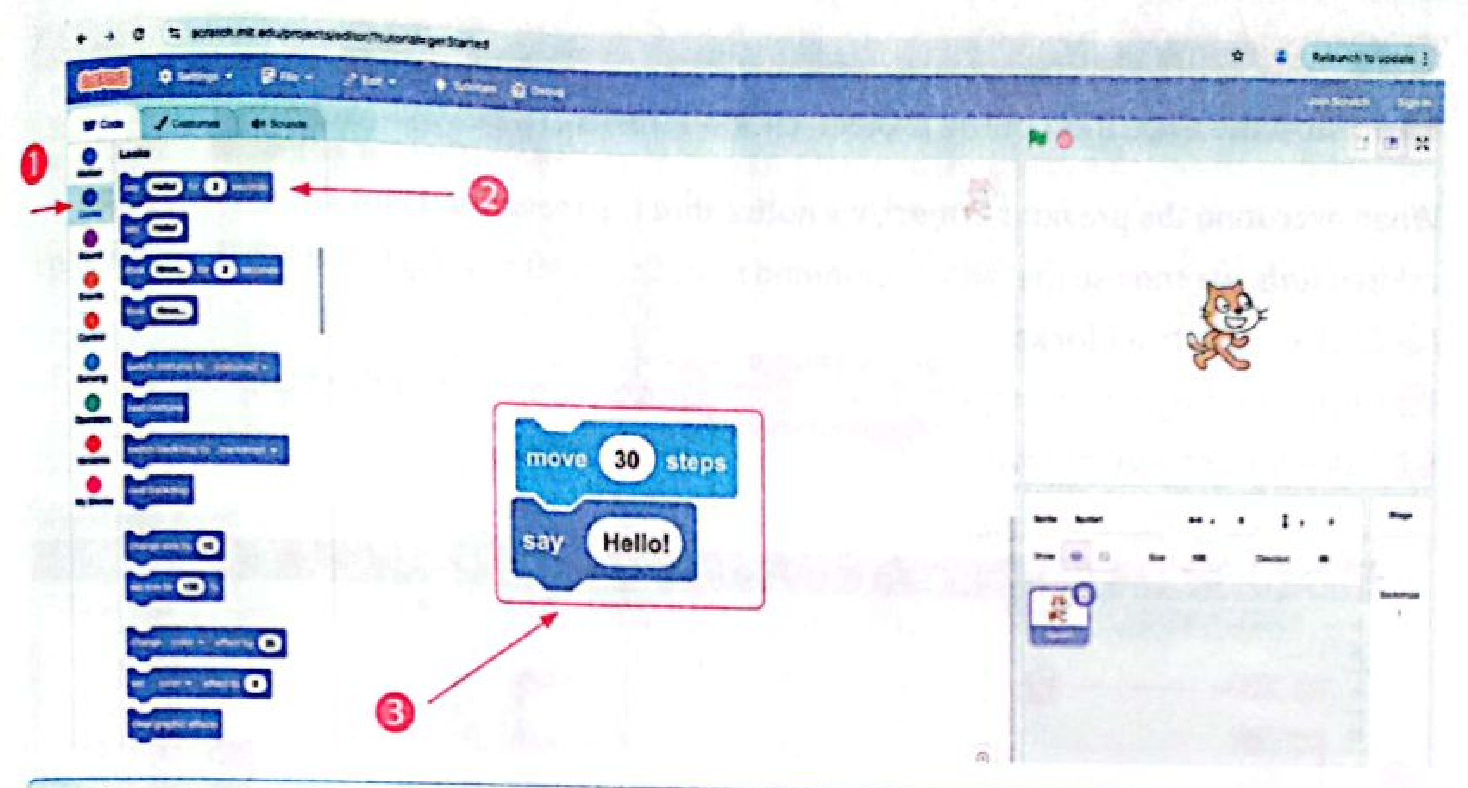
- To make the object's movement steps **30 steps**, double-click on the value 10 on the **(command)** block and write the **value 30** as in the following figure.



To display the phrase "Hello" :

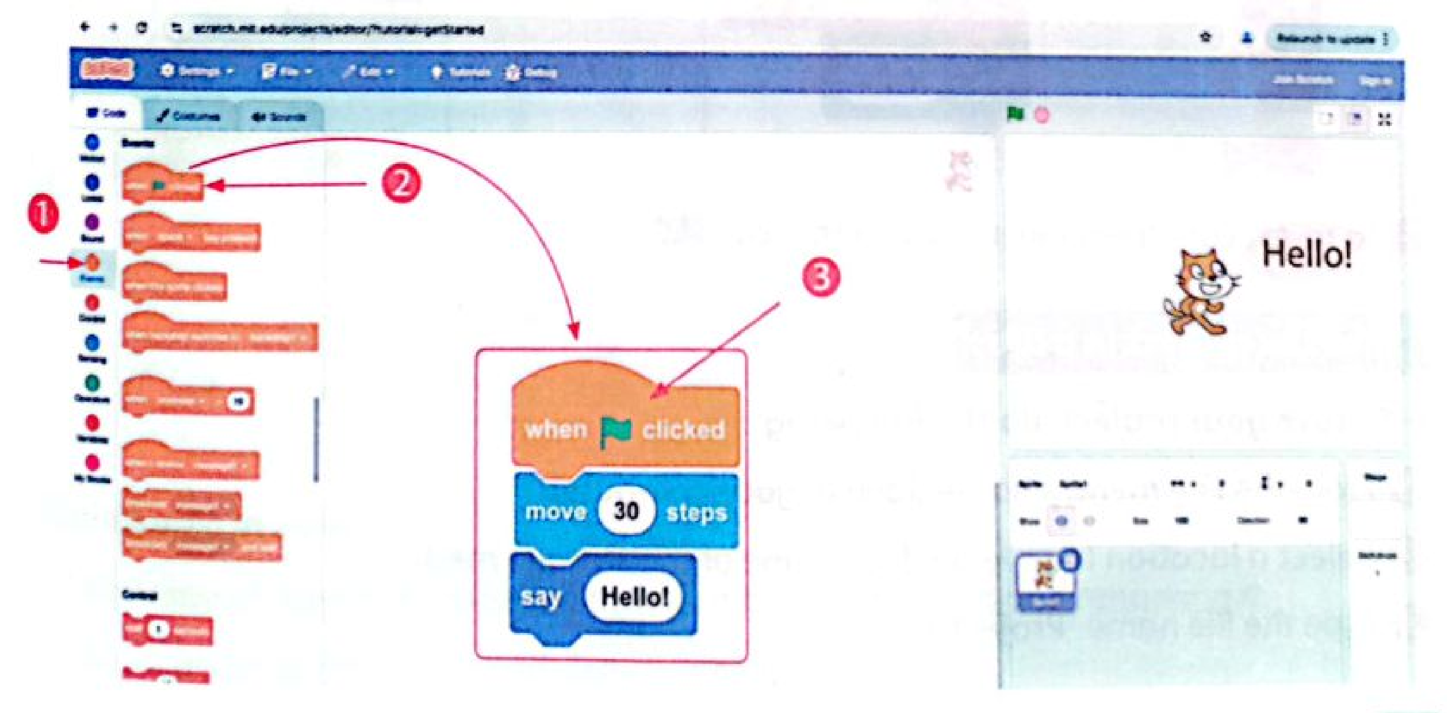
say Hello!

1. Select the **Looks** command group.
2. Then **select the command.**
3. Then click and **drag** on the command and drop it into the platform below the previous command.



To view the implementation of the project steps : لعرض تنفيذ خطوات المشروع :

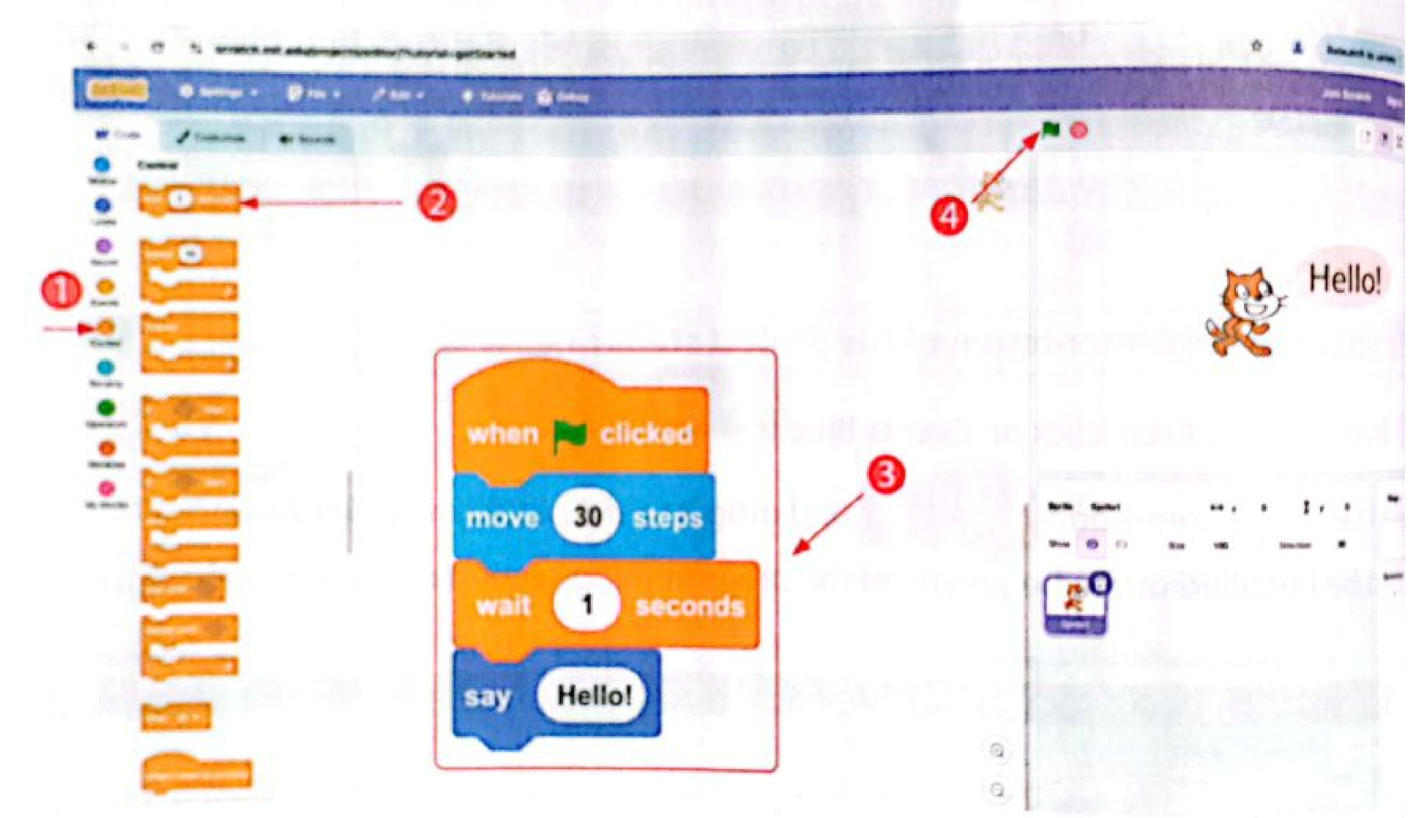
1. In the Blocks Area, click on **Events Blocks**.
2. Click on the command when clicked and drag it to the platform (Script Area).
3. To be installed at the beginning of the programming section as shown in the figure.



4. To execute the project, click on the icon 🏴.
5. To stop the execution of the project, click on the icon 🔴.

When executing the previous project, we notice that the movement was done quickly. To address this, we can use the "wait" command from Control Blocks by following the following:

1. Click on **Control Blocks.**
2. Click and drag a command **wait 1 seconds** and drop it into the Script Area.
3. Place it as shown below:

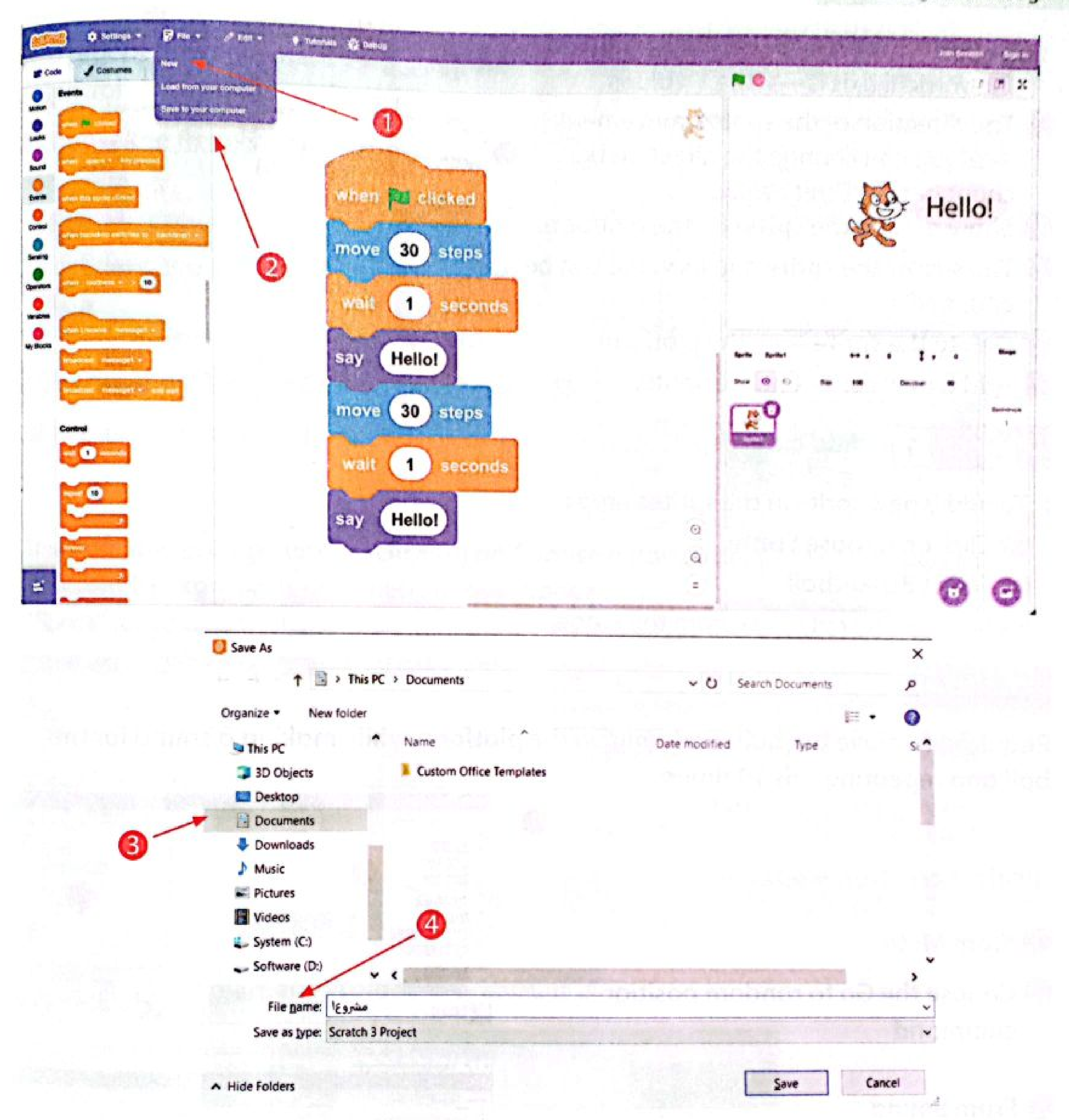


4. To re-execute the project, click on **the icon** 🏴.

Save the project in a file :

▸ **To save your project, do the following:**

1. From the **File menu** ,choose **Save to your computer.**
2. **Select a location** to save the file on one of the storage media.
3. Type the file name **"Project 1"**



Sprites area in Scratch

1. **The name of the sprite:** you can modify it by clicking on it and renaming it.
2. **The location of the sprite and determines it:**

the horizontal axis is → **the X values**

the vertical axis is → **the Y values**

3. **The direction** of the sprite's movement → you can change the direction by changing the Direct value.
4. **Show or hide the sprite** on the platform.
5. **The size of the sprite** and its value can be changed.
6. **Delete the sprite** from the platform.
7. **Add a new sprite** Choose Sprite.

Project 1 Add a new sprite :

- **To add a new sprite in the sprites area :**
  1. Click on **Choose Sprite.**
  2. Select **Basketball.**
  3. Remove the **cat sprite** from the **stage.**

Project 2

Required to move the ball randomly on the platform while making a sound for the ball and repeating this 10 times:

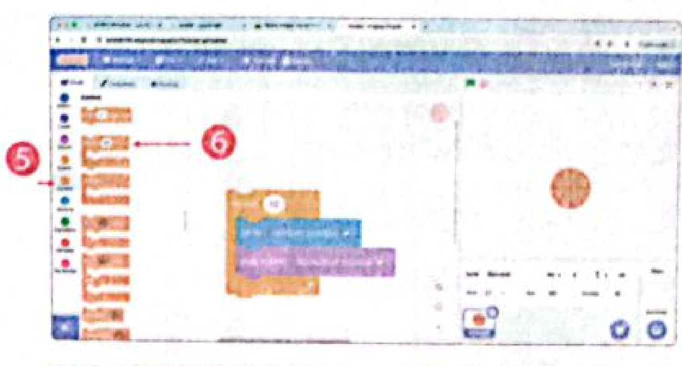


Project creation steps :

1. **From Motion**
2. **Choose the Go to random position command**
3. **From Sound**
4. **Choose the command Play sound**

5 To repeat the movement 10 times from Control

6 Choose the Repeat command

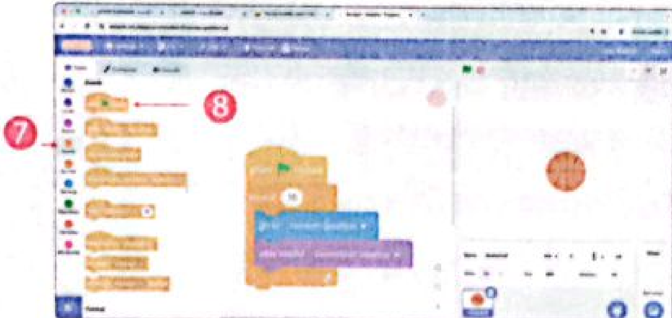


To execute the project :

7 From Events

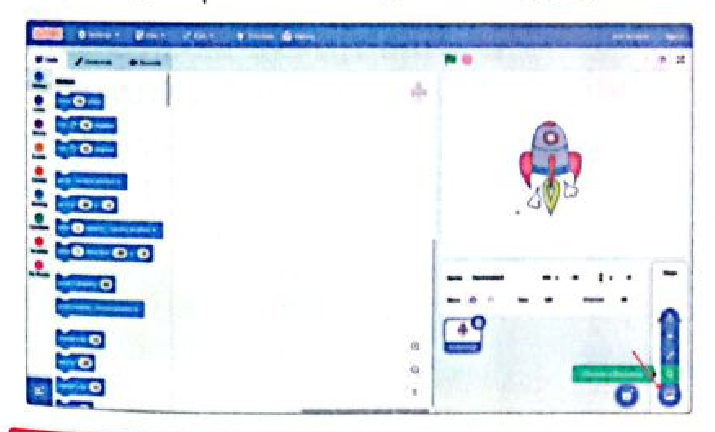
8 Choose the when [green flag] Clicked command

Test the execution of the project



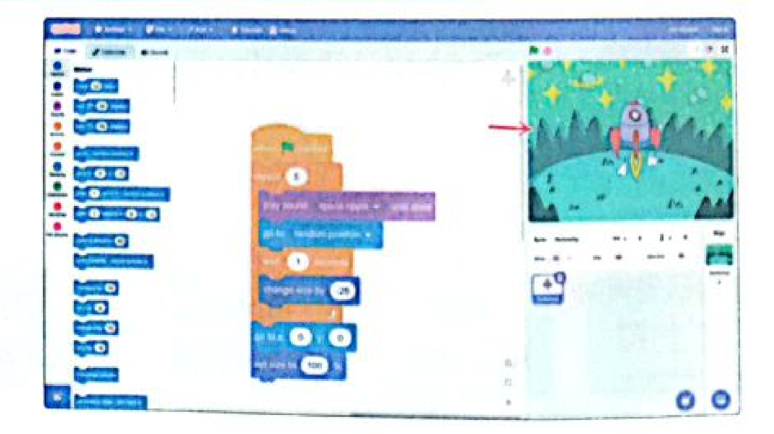
▸ Insert a new background by clicking on Choose a Backdrop, browse through the different backgrounds and then choose "Space".

ادرج خلفية جديدة وذلك بالضغط على Choose a Backdrop، تجول وسط الخلفيات المختلفة ثم اختر "Space".



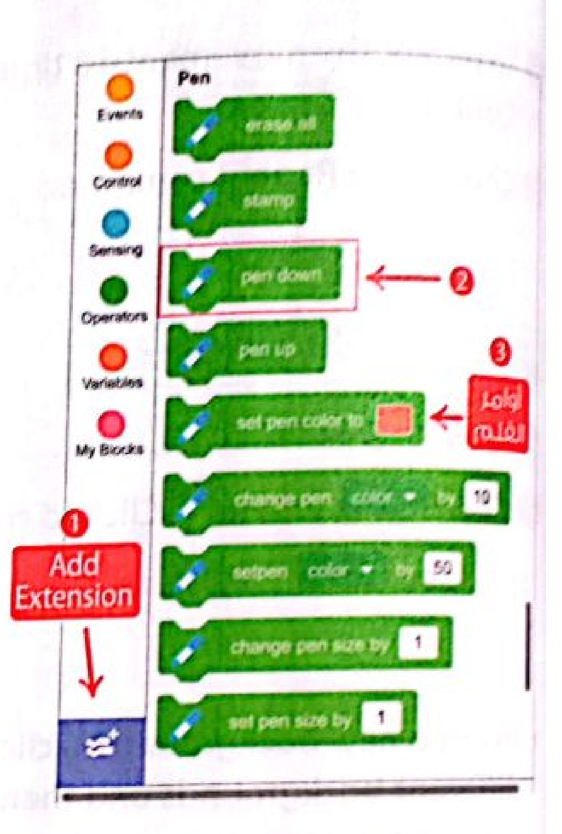


Project 3 Implement Project قم بتنفيذ المشروع (٣)

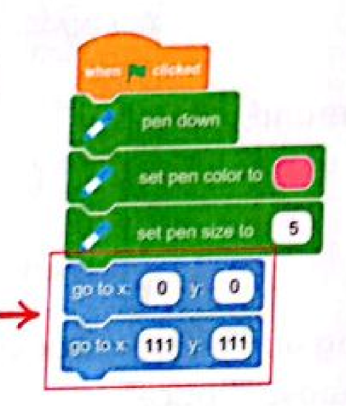


Project Square Drawing Project مشروع رسم مربع

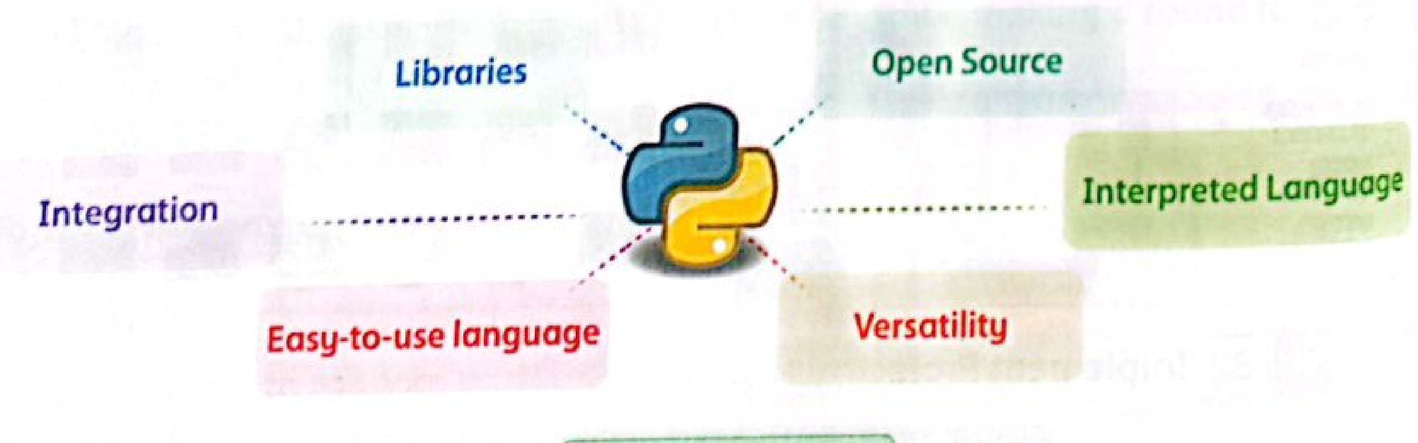
1. Open a new project.
2. Select the pen.
3. Setting Color and Size.

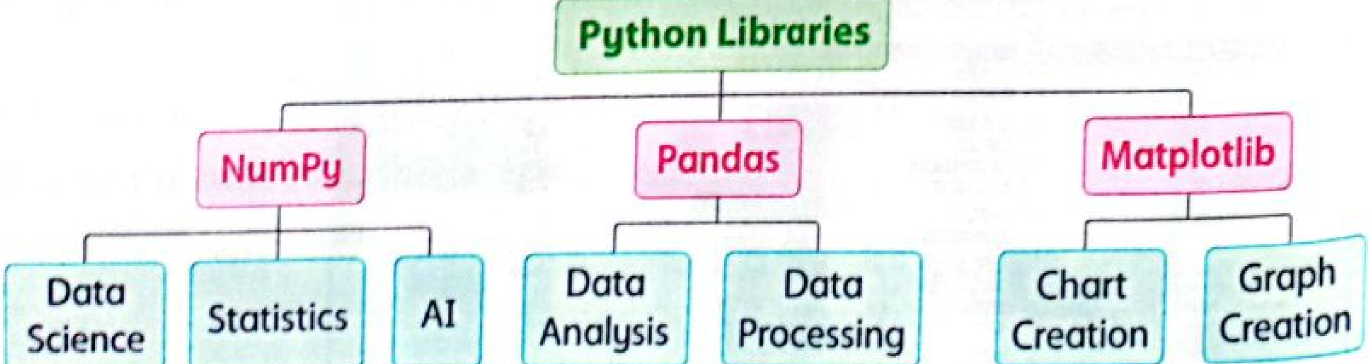


4. Moving the Pen from the beginning to the end.
5. Repeating Steps.



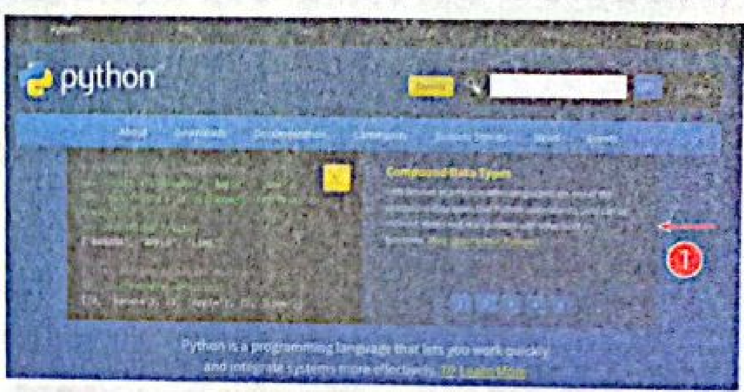
Features of Python



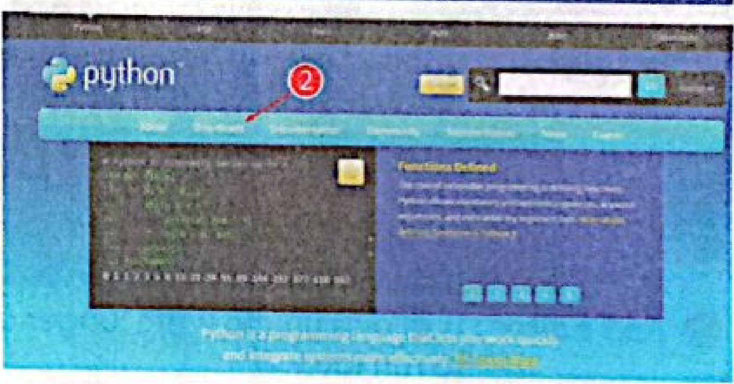


How to download the program from the official website

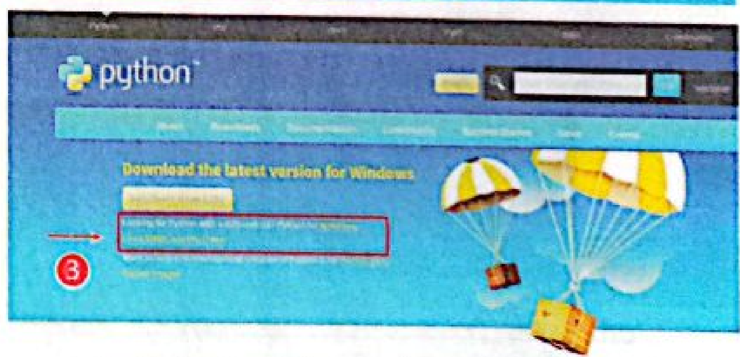
1. Visit the official Python website
www.python.org



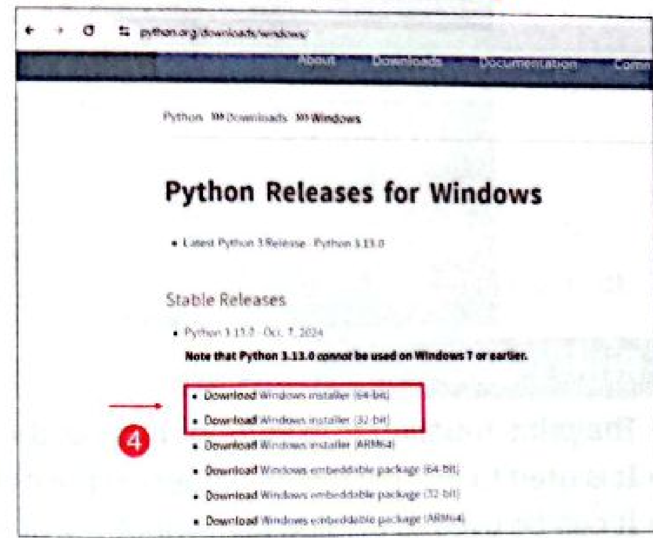
2. Choose "Download".



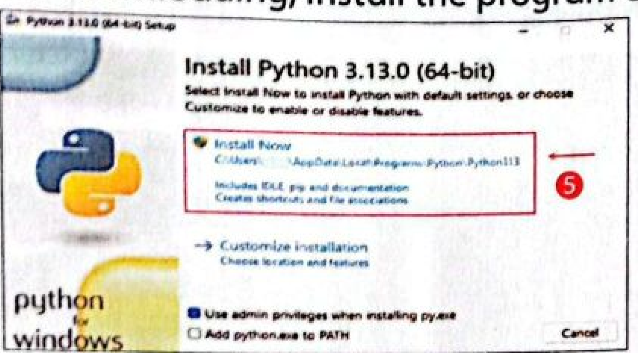
3. Then choose **the system you are working** on (**Windows, Mac,** or **Linux).**

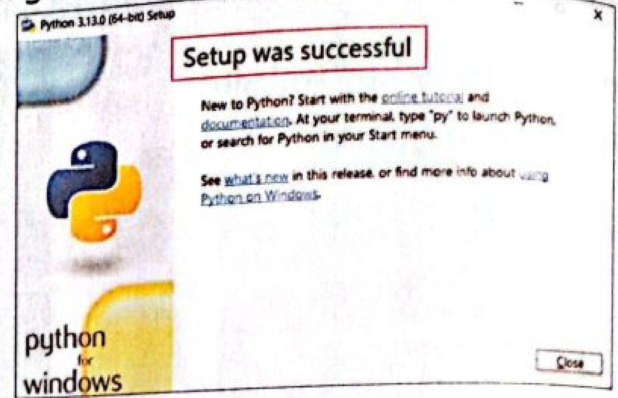


4. You must choose 64 bit or 32 bit, according to your device specifications.



5. After downloading, install the program on your device and follow the instructions.





Python program interface

1. **Through the interactive Python interface (Python Shell):** You can write simple codes and execute them directly to see the results.

```
Python 3.10 (64-bit)
Python 3.10.4 (tags/v3.10.4:9d38120, Mar 23 2022, 23:13:41) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> print("Hello World")
Hello World
>>>
```

2. **Text editor :** It allows you to write longer and more complex codes and save them to run later.

type ( ) function

▶ To know the type of the variable you can use the type ( ) function

```
Python 3.10 (64-bit)
Python 3.10.4 (tags/v3.10.4:9d38120, Mar 23 2022, 23:13:41) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> X = 5
>>> Y= 10
>>> Z = 5.25
>>> A = 8.32
>>> name = "Taher"
>>> city = 'Cairo'
>>> type (X)
<class 'int'>
>>> type (Y)
<class 'int'>
>>> type (Z)
```

▶ Simple Python Code Using Variables

```
Python 3.10 (64-bit)
Python 3.10.4 (tags/v3.10.4:9d38120, Mar 23 2022, 23:13:41) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> name = "Omar"
>>> address = "Cairo, Egypt"
>>> age = 13
>>> print ("My name is", name)
My name is Omar
>>> print ("I live in", address)
I live in Cairo, Egypt
>>> print ("I am", age)
```

Print ( ) function

- The print function ( ) in Python is one of the most commonly used functions.
- It is used to display text or values on the output screen.
- It can be used to display text, variables, or even the results of mathematical operations.



A day is enough

Lesson 1 Artificial Intelligence Applications

1 Choose the correct answer from a, b, c or d.

1. From the Artificial Intelligence fields ....
   a. machine learning b. Deep learning c. Robotics d. all of them
2. .... is the most advanced type of artificial intelligence.
   a. Narrow b. General c. Super d. Nothing of them
3. The function of the smart shopping is to ....
   a. Diagnose diseases b. offer suggestions for products
   c. Translate languages d. data analysis
4. Artificial intelligence is used in medicine in ....
   a. games Development b. money Data processing
   c. languages learning d. Diagnose Diseases
5. From Applications of artificial intelligence in our daily life are ....
   a. personal Assistant b. smart cars
   c. smart shopping d. all of them

Answer		Explanation
(1)	d	Artificial intelligence fields are machine learning, Deep learning , Robotics natural language Processing and computer vision.
(2)	c	Super artificial intelligences (SAi) is the most advanced, it can solve problems that are difficult for humans to solve easily.
(3)	b	Smart shopping offer you suggestions for products that you might like that artificial intelligence analyzes your purchasing behavior.
(4)	d	Doctors use artificial intelligence to help them in Diagnose and treat diseases faster and more accurately.
(5)	d	applications of artificial intelligence in our daily life are personal assistant, Smart games Smart cars, Digital Doctors, instant translate or smart shopping.

2 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. Super artificial intelligence (SAi) focuses on performing a specific task, such as recognizing faces. (×)
2. Artificial intelligence is used only in smart games to make them more fun. (×)
3. Machine learning and Robotics are from artificial intelligence fields. (✓)
4. Artificial intelligence need a large amount of information. (✓)
5. Natural language processing is not like an intelligent language. (×)

Answer		Explanation
(1)	×	Super artificial intelligence (SAi) is the most advanced, it can solve problems that are difficult for humans to solve easily.
(2)	×	Artificial intelligence is used in many applications like smart games, personal assistant, smart cars, Digital Doctors , smart shopping.
(3)	✓	Artificial intelligence fields are machine learning, Robotics computer vision, initatie to human and take decision and natural language processing.
(4)	✓	Artificial intelligence needs a large amount of information for learning.
(5)	×	Natural language is like an intelligent language as it understands written and spoken human language.

3 Complete the following sentences with the appropriate words in brackets.

(Intelligent Language translator – smart shopping – cleaning house - natural language processing – Narrow)

1. Artificial intelligence is used in smart games, Instant translator, ...
2. Types of Artificial intelligence are .... , general super.
3. Artificial intelligence robotics are used in play chess , ...
4. Artificial intelligence fields are machine learning, ... , robotics.
5. Natural language processing is like .... as it understand human language.

Answer		Explanation
(1)	Smart shopping	in our daily life artificial intelligence is used in many usage like personal assistance, smart games smart cars, Doctors use it in diagnoses diseases, translations, smart shopping.

(2)	Narrow	Types of Artificial are Narrow which focuses an specific task, general which can perform any task and, super is most advanced, it can solve problems.
(3)	cleaning house, playing chess	Smart robotics can do many tasks such as cleaning house, playing chess, precise surgery and ability to work with dangerous environment to humans.
(4)	natural language processing	Artificial intelligence fields are machine learning, natural language processing, robotics, computer vision, Expert systems and Deep learning.
(5)	Intelligent language translator	Natural language processing is like an intelligent language translator as it understands human language written and spoken and interprets it.

Lesson 2 Sensors

1 Choose the correct answer from a, b, c or d.

1. What is the purpose from converting information to signal in sensor device ....
   a. sending signals to another device
   b. display results
   c. converting information to signal that can be understood by the receiving device to take decision
   d. all of them

2. To select the appropriate type of sensor. There are an important factor is ....
   a. Required accuracy
   b. manufacturing country
   c. year of manufacture
   d. device colour

3. From infrared sensors devices usage Examples are ....
   a. Remote controls
   b. non-contact thermometers
   c. Both (a & b)
   d. none of them

4. The last step from sensors devices work steps is ....
   a. sensing
   b. signal conversion
   c. transmission
   d. none of them

5. From Robotic sensor devices types are................ .
   a. distance sensors
   b. light sensors
   c. sound sensors
   d. all of them

	Answer	Explanation
(1)	c	When sensor device Receive information from the surrounding environment it converts it into electrical signals, then send it to devi which understand signal and take decision or perform a task.
(2)	a	To select the appropriate type of sensor depends on factors They ar required range, required accuracy, operating environment cost.
(3)	c	From infrared sensors devices usage the remote controls, non conta thermometers to measure temperature without direct contact.
(4)	c	The last step of sensors work is transmission which sensor send sign to another device to display results or perform a specific task
(5)	d	Robotic sensors are many some examples are (distance-light-sound motion and special sensors).

2 Put (✓) in front of the correct sentence and (×) in front of the wrong one

1. The main function of the sensor device is converting the environment changes to signal which understood by other devices. (
2. The first work step of the sensor device is sending signals to a device which display the results. (
3. The infrared sensors devices are used in electronic devices. (
4. Sensors devices help robots to learn new languages. (
5. Distance sensors are used to avoid surrounding obstacles and collisions. (

	Answer	Explanation
(1)	✓	Sensors devices sensing the surrounding environment changes and conve it to signal so devices understand it and take suitable decision.
(2)	×	The first work step of sensor device is sending captures information from surrounding environment.
(3)	✓	infrared sensors devices are used in electronic devices and measure temperature without the need of direct contact.
(4)	×	Sensors devices help robotics to measure distance, adapt to changing ligh conditions and react to sounds.
(5)	✓	Distance sensors are used to avoid surrounding obstacles and collisions.

3 Complete the following sentences with the appropriate words in brackets.

(Robot surgeon – Required range – Sensing – Light sensors – Smart phones)

1. Sensors devices work through 3 main steps are ...., signal conversion and transmission.
2. There are several factors which depend on them to choose the appropriate sensor device type are ...., required accuracy environment and cost.
3. Sensors devices which used in our daily life are ...., smart phones, modern cars, phone microphone.
4. .... are sensors devices which are used by robot which work in places where light is variable.
5. .... are from devices which is used to performing surgeries.

	Answer	Explanation
(1)	sensing	• Sensing capture information from the surrounding environment. • Conversion (convert information to signal). • Transmission (send signal to another device to display result or take decision).
(2)	Required range	• The maximum distance which device measure. • The required measurement accuracy. • The environmental conditions. • The cost of the devices and installiations.
(3)	Smart phones	• Sensors help in taking pictures, adjusting light level • In modern cars it is used to determine speed, help the driver park his car. • Sensors turn on lights automatically when someone enter the rooms. • Convert sound to electric signal which can be understood by phone.
(4)	Light sensors	Robot use light sensor devices which help the robot adapt to changing light conditions.
(5)	Robot surgeon	The robot surgeon use accurate sensor device to perform surgeries.

Lesson 3 Robots

1 Choose the correct answer from a, b, c or d.

1. The Robot is ....
   a. a device which can be programmed to perform specific tasks manually.
   b. a device which can be programmed to perform specific tasks automatically.
   c. a device which can be programmed to perform unspecific task.
   d. a device which can not be programmed.

2. Types of robots are ....
   a. industrial and home
   b. medical and educational
   c. both a&b
   d. nothing of the previous

3. The functions of sensors within robot components are ....
   a. data analyzation
   b. movements
   c. discovering information
   d. sending commands

4. Types of motor which are used in robots are ....
   a. electric and pneumatic
   b. electric and water
   c. water and gas
   d. pneumatic and water.

5. The main part in robot which carry all the components of the robot ....
   a. sensors
   b. structure
   c. motors
   d. controller

	Answer	Explanation
(1)	b	The robot is a device that can be programmed to perform a set of specific tasks automatically. It can move, sense via sensors, and interact with its surroundings. It can be used in environments that require precision and speed.
(2)	c	There are several types of robots including industrial, home, medical and educational.
(3)	c	Sensors are the senses of a robot which are used to pick up information from surroundings like sound, picture.
(4)	a	Motors are used to move parts of a robot, there are different types of motor such as electric , pneumatic each has a usage. It is considered the robot muscles.

(5)	b	The structure is the main part that carries all the components of the robot, it can be made of different materials like metal, plastic or carbon its design affects the weights of the robot and its ability to move.

2 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. Robot is used in medical field only. (×)
2. Industrial robot they can perform work with high accuracy. (✓)
3. Software is from robot component which affect its weight and its ability to move. (×)
4. Eduction is not from the areas of use of robots. (×)
5. The controller in the robot process the data collected by the motors and issuing commands to the sensors. (×)

Answer		Explanation
(1)	×	Robot have many applications in different fields including industry, health care , education, agriculture
(2)	✓	Industry robot can perform work with high accuracy, improving productivity and reducing human errors.
(3)	×	The structure is the main part which affect the weight of the robot and it can be made from materials such as metal, plastic , carbon and it carries all components of the robot.
(4)	×	Education is from areas of use of robots and also healthcare and agriculture
(5)	×	The controller unit of the robot process data collected from sensors and issuing commands to motors.

3 Complete the following sentences with the appropriate words in brackets.

(Educational robots – Motors – Software – Bluetooth – Controller)

1. Sensors are considered the robot senses but .... is considered the robot muscles.
2. .... is considered the robot brain which take the necessary decisions.
3. .... makes the robot smart and determine how the robot responds to the information it receives.
4. .... and wi-fi are from communication tools which the robot use.
5. .... is the robot type which is used in schools to teach students how to program and technology.



	Answer	Explanation
(1)	Motors	Sensors are the senses of a robot like, eyes and hear but motor are considered the muscles which robot use to move and perform commands.
(2)	controller	it is considered the Robot Brain which process Data which collected by sensors and issue commands to motors.
(3)	Software	is what makes the robot smart and determine how robot responds to the information received from sensors.
(4)	Bluetooth	are tools which are used by robot to interact with users or other robots.
(5)	Educational robots	are used in schools to teach students how to program and technology.

Lesson 4 Scratch

1 Choose the correct answer from a, b, c or d.

1. Scratch program allows students to ....
   - a. learning advanced programming languages
   - b. learning the basics of programming
   - c. designing webpages
   - d. writing reports
2. .... is considered programing sections.
   - a. Script area
   - b. Stage area
   - c. Sprites area
   - d. Commands blocks area
3. To create a project using scratch program you have first to ....
   - a. create project
   - b. know the program interface
   - c. save project
   - d. download the program to computer
4. .... it is not from scratch program advantages.
   - a. Simple interface
   - b. Educational program
   - c. Free program
   - d. Allow learning complex code
5. Scratch program interface areas are like ....
   - a. command blocks
   - b. stage
   - c. Both (a&b)
   - d. none of them

Answer		Explanation
(1)	b	Scratch program allows Students to learn the basics of programming in a visual and enjoyable way without the need to write a lot of complex codes.
(2)	a	There are some areas in scratch program like command blocks, stage script, sprites but script area collects programming sections.
(3)	d	You have to download the program to your computer first freely from the official website link https : // scratch. mit.edu then know the program interface then create the project and save it.
(4)	d	Scratch program has many advantages like simple interface, educational program, free program develop creative thinking, enhancing problem. Solving skills , develop collaboration skills, and sharing project, But give the basic programming not the complex programming code.
(5)	c	Scratch programs has many areas like commands blocks, stage, sprites and script.

2 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. Scratch program can be download from its official website. (✓)
2. Scratch program doesn't develop collaboration skills. (×)
3. Scratch program is used in teaching advanced programming. (×)
4. Scratch program helping learning the basics of programming in an interesting and exciting way. (✓)
5. Scratch project car be saved from file menu select save to your computer. (✓)

Answer		Explanation
(1)	✓	Scratch program can be downloaded from its official website (https:// scratch. mit.edu)
(2)	×	Scratch program develop collaboration skills where students can work together on scratch projects.
(3)	×	Scratch program is used to learn principles of programming in an interactive and exciting way without complex code or advanced code.

(4)	✓	Scratch program help in learning basics of programming language in an interesting and exciting way without need to many complex code.
(5)	✓	To save your scratch project open file menu then select save to your computer , then select a place in your computer to save the file in and name your project.

3 Complete the following sentences with the appropriate words in brackets.

(Save to your computer - sprites – creative thinking – learn principles of programming – simple interface, educational program)

1. The main purpose of learning Scratch program is ....
2. Scratch program features are ....
3. To save your Scratch project select file menu then selects ....
4. Scratch program area are blocks, script, stage and ....
5. Scratch program help students to learn principles of programming and ....

	Answer	Explanation
(1)	learn principles of programming	Scratch program allow student to learn principles of programming and be creative while learning and have fun and in enjoyable and visual way.
(2)	simple interface, educational program	Scratch program has many features (advantages) like it has a simple interface, educational program, free program, develop creative thinking , enhance problem-solving skills, develop collaboration skills an exciting start to the world of the programing and sharing the project.
(3)	save to your computer	To save the project: 1. From file menu select. 2. Save to your computer 3. Select a place to save the project to a storage space. 4. Writer project (file) name.
(4)	sprites	Scratch program has the following areas: 1. Blocks (commands) 2. script 3. stage 4. sprites
(5)	creative thinking	Scratch program help students in: 1. learning principles of programming in a visual and enjoyable way. 2. develop creative thinking. 3. develop collaboration skills.

Lesson 5 Sprites Area in Scratch

1 Choose the correct answer from a, b, c or d.

1. .... area where sprite or sprites which used in the project appear.
   a. stage b. sprites c. menu d. script
2. To modify (rename) the sprite name click on ....
   a. (sprite) and renam it
   b. (sprite) and delete it
   c. (sprite) and add it
   d. (sprite), change its color
3. The purpose of the command (go to random position) is ....
   a. moving the sprite to a selected place
   b. hide sprite
   c. moving sprite a randomly on stage
   d. delete sprite
4. To add accompanying sound select the block (command) ....
   a. when clicked b. say c. motion d. sound
5. To add a new sprite click ....
   a. choose sprite b. stage c. motion d. when clicked

	Answer	Explanation
(1)	b	The sprites which are used in a project appear in sprites area where we can add, delete rename , resize, ... sprites.
(2)	a	To modify the sprite name use sprites area by clicking on the sprite you want to change its name , then rename it.
(3)	c	The purpose of using the block (command) go to random position is the sprite to move to undefined place in a randomly way.
(4)	d	To add a background sound be accompanying sound to sprite movement select the Block (command) sound then select play sound.
(5)	a	You can add sprites to stage when you want by using sprites area then select choose sprite then a window will appear including a group of sprites to choose from.

2 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. After adding sprite you cannot modify its name. (×)
2. The location of the sprite on the stage is determined by the horizontal axis X, and the vertical axis Y values. (✓)

3. Inserting a new background for the project through choose a backdrop. (✓)
4. One sprite only can be added to the stage. (×)
5. You can change the movement direction of the sprite from the block (command) move. (×)

Answer		Explanation
(1)	×	You can modify the sprite name any time by clicking on it in sprites area, then write the new name .
(2)	✓	The sprite location will determined from the value of the axises (horizontal axis x , vertical axis Y) where the stage has x, y axis.
(3)	✓	To insert a new background to your project from choose a backdrop then select a suitable background to your project.
(4)	×	You can add many sprites to your project to appear on stage of the project.
(5)	×	You can change the movement direction of the sprite from sprite area, select the sprite which you want, then change the directing value to a suitable value.

3 Complete the following sentences with the appropriate words in brackets.

(Sprites – choose sprite – sprites – Y axis – changing its size value)

1. The sprites which is used in the project appears in .... area.
2. To know the sprite current location on stage use X axis and ....
3. You can add a new sprite by clicking on ....
4. You can change sprite size from ....
5. You can hide/show the sprite form .... area.

Answer		Explanation
(1)	sprites	Sprites area contains sprite or sprites which are used in project where from you can control sprite features.
(2)	Y axis	Sprite current position (location) on stage are known form (X axis, Y axis) values.
(3)	choose sprite	To add a new sprite use sprites area then click on choose sprite, then choose the sprite you want.
(4)	changing its size value	To change sprite size use sprites area, then select sprite you want to change, then from size box, change its value.
(5)	Sprites	To show/hide sprite use sprites area then from show/hide icon click on it to show/hide sprite.

Lesson 6 Principles of Python

1 Choose the correct answer from a, b, c or d.

1. .... is considered from python features.
   a. Payed b. Open source c. Uninterpreted d. Limited-use
2. .... is considered an interpreted (understood) programming language and use words similar to English.
   a. Python b. Java c. C # d. C ++
3. .... is from python libraries which is used to analyze and processing data.
   a. NumPy b. Pandas c. Both a & b d. None of them
4. To download the program of python after visiting its official website and clicking on download you have to ....
   a. pay fees
   b. choose version
   c. choose the system which your device work with (win, linux, mac)
   d. install the program to your device
5. .... is not from python advantages.
   a. Open source
   b. Interpreted language
   c. Multi-use
   d. None of them

	Answer	Explanation
(1)	b	Python language has many features like: open source interpreted, versatility, easy to use, integration and libraries
(2)	a	Python language is one of the easiest languages. It is simple and organized formula and uses words similar to English unlike other programming languages.
(3)	b	Python language has many libraries which you can use, pandas is from python libraries which is used to analyze and process data.
(4)	c	To download python language program to your device you have to: 1. visit the official website for python www.python.org 2. click download 3. select the system which your device work with window, Mac, linux. 4. select 64 bit or 32 bit according to your device.

(5)	d	All of them are python features like open source - free-interpreted - versatility - easy - to use. integration- it is used to develop web applications artificial intelligence - machine learning.

2 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. Python language is free and open source. (✓)
2. Python language is used in developing web applications and artificial intelligence. (✓)
3. Python language doesn't have any libraries which you can use. (×)
4. Python language is not used in developing Data science. (×)
5. Python is an interpreted language which means that it translate codes line by line, so if there are errors it will stop till errors corrected by programmers. (✓)

Answer		Explanation
(1)	✓	Python language is considered from free and open source languages.
(2)	✓	Python language is used in developing web applications , data science, artificial intelligence , machine learning.
(3)	×	Python language has a big library which contain big number of libraries to use it as a ready solution without writing code.
(4)	×	Python language is used in developing data science and also web applications, machine learning, artificial intelligence
(5)	✓	Python language is an interpreted language which means that it translate codes line by line, so if it found errors it will stop till programmer correct errors.

3 Complete the following sentences with the appropriate words in brackets.

(pandas - Java - NumPy - open source interpreted versatility - develop applications)

1. Python language can be integrated with other language like C++, C#, ...
2. Python language library which is used in statistics is ....
3. Python language is distinguished as ....
4. Python language contains many libraries like NumPy .... and matplotlib.
5. Python language can be used in ....

	Answer	Explanation
(1)	Java	Python language can be integrated with other language like C# , C++ , Java
(2)	NumPy	In python (NumPy) library is used in data science, statistics and artificial intelligence.
(3)	Open source interpreted versatility	Python language features are many like it is open source and free, interpreted and versatility , integrated, and libraries.
(4)	pandas	Python language contain libraries which contain code ready made to use to solve many problems NumPy used in data science, statistics pandas : used to analyze and process data Matplotlib: used to create graphs and charts.
(5)	develop applications	used to develop web applications, data science artificial intelligence, machine learning games.

Lesson 7 Variables in Python

1 Choose the correct answer from a, b, c or d.

1. Variables in programming language express ....
   a. constant value doesn't change
   b. data type
   c. A reserved place in memory to store and save a specific value
   d. function
2. From conditions for naming variables in python ....
   a. name begins with a letter or an underscore
   b. name contains letters (A – Z) , numbers, underscore
   c. name shouldn't be a reserved word in python
   d. all of them
3. Types of variables in python like ....
   a. numbers (int, float)
   b. booleans
   c. string
   d. all of them
4. The function of " .... " in python is to display text, values on screen.
   a. type ( )
   b. print ( )
   c. editor
   d. pythons shell

5. The interactive python interface is ....

a. python shell
b. editor
c. string
d. none of them

Answer		Explanation
(1)	c	in programming language variables Express a reserved place in memory to store and save a specific value and the values can be changed.
(2)	d	Conditions for naming variables in python are: 1. Variable name begins with a letter of underscore _ 2. Variable name can contain letters (A-Z), (a-z), numbers and underscore_ 3. Variable name shouldn't be a reserved word in python.
(3)	d	Types of variables in Python are : 1. Number ⟶ integer , decimal (int, float) 2. strings 3. booleans
(4)	b	Print ( ) function in python is used to display text , variables , results on screen.
(5)	a	The interactive python interface (Python shell) is used to write simple code and execute it directly to see results.

2 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. Variables name can be used in upper or lower case without any distinction (names are case - insensitive). (×)
2. Print ( ) function is used in knowing type of the variable. (×)
3. Python language use integer number only. (×)
4. Variables are reserved places in memory to store and save specific values. (✓)
5. Reserved words can't be used as a variable names in python programming language. (✓)

Answer		Explanation
(1)	×	Python language is case sensitive which differentiate between upper and lower case , so the same variable name in lower case differ from the variable in upper case ROSE is variable, and rose is another variable.
(2)	×	Type ( ) function is used to know the variable data type.

(3)	×	In python there are integer number int, and decimal number is float .
(4)	✓	In programming language, variables represent reserved places in memory to store and save specific value.
(5)	✓	From conditions for naming variables that , name shouldn't be reserved word in python because it express specific values understand by the language.

3 Complete the following sentences with the appropriate words in brackets.

(type – print – Python shell – memory – letter)

1. In programming language variables express reserved places in ....
2. In python language variable name must begin with .... or underscore.
3. .... is a function used to know variable type in python language.
4. .... is an interactive interface in python.
5. .... is a function used to display text, values on screen.

	Answer	Explanation
(1)	memory	In programming language variables express reserved places in memory to store and save values.
(2)	letter	From conditions for naming variables in python language variables name begins with letter or underscore _
(3)	type ( )	The function which is used to know variable type in python language is type ( ).
(4)	Python Shell	The interactive interface in Python is called Python Shell.
(5)	print ( )	The function which is used to display text, values on screen is called print ( ).



Ten Sample Tests

Test 1

1 Choose the correct answer from a, b, c or d.

1. .... sensors device help cars to determine the distance to other cars.
   a. Sound b. Visible light c. Infrared d. Distance
2. To add a new sprite click on ....
   a. choose sprite b. Stage c. when 🏴 clicked d. Motion
3. .... is a device that can be programmed to perform tasks automatically.
   a. Sensor b. Scratch c. Robot d. Python
4. Robot heip in dangerous tasks like ....
   a. cleaning house b. transportation system
   c. agricultural watering
   d. heavy weights and hazardous chemicals
5. Applications of artificial intelligence in our daily life like ....
   a. smart shopping b. personal assistance
   c. Both (a , b) d. none of them

2 Complete the following sentences with the appropriate words in brackets.

(Educational program – sprites – Safety – Distance Sensors – machine language translator)

1. The sensor device type which used to avoid collisions ....
2. .... and employment are challenges facing robots technology.
3. Natural language processing is like .... as it understands human language.
4. .... is from Scratch program features.
5. From .... area sprites can be shown/ hidden.

3 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. Robot device doesn't need to software in his work. ( )
2. In Scratch program, the program section appear in stage area. ( )
3. In Python language the variable type is known by using type ( ) function. ( )
4. In Scratch program the sprite location is determined by the value of the horizontal axis X, the vertical axis Y. ( )
5. The artificial intelligence is used in making smart games only. ( )

Test 2

1 Choose the correct answer from a, b, c or d.

1. .... express reserved places in memory to store and save specific value.
   a. Variables b. Constants c. Functions d. None of them

2. To add a new sprite in Scratch program ....
   a. sound b. choose sprite c. motion d. say
3. In Scratch program interface there are areas like ....
   a. blocks b. stage c. sprites d. all of them
4. Sensors which are in robot has a function, it is ....
   a. analyzing data b. moving
   c. pick up information d. sending commands
5. Artificial intelligence are used in medical field like ....
   a. develop games b. analyzing data
   c. learning language d. diagnose diseases

2 Complete the following sentences with the appropriate words in brackets.

(Signal Conversion – Software – sprites – Super AI – Save to your computer)

1. The most advanced artificial intelligence is ....
2. The second step of sensor device work is ....
3. .... is what makes a robot smart and determine how it responds to information.
4. To save your project in Scratch program select .... from file menu.
5. In Scratch program you can hide / show sprite from .... area.

3 Put (✓) in front of the correct sentence and (x) in front of the wrong one.

1. Type ( ) function is used to know variable type in Python language. (   )
2. The artificial intelligence is one type. (   )
3. The robot is used in factories only. (   )
4. In Scratch program you cannot share your works with your classmates. (   )
5. To stop the project execution click on start. (   )

Test 3

1 Choose the correct answer from a, b, c or d.

1. Challenges which face robots technology are ....
   a. safety b. employment c. ethics d. all the them
2. To display text, variables and arithmetic operation results in Python language the function .... is used.
   a. print ( ) b. sin ( ) c. type ( ) d. none of them
3. The first step of sensor device work is ....
   a. transmission b. display c. sensing d. conversion
4. From data type in Python language ....
   a. number b. string c. booleans d. none of them
5. In Scratch program the block go to random position is used in ....
   a. move sprite a random movement b. delete sprite
   c. move to a specific place d. hide sprite

2 Complete the following sentences with the appropriate words in brackets.

(perform work with high accuracy – X , Y – picking up information – Float – diagnose diseases)

1. Sensors in robot help in ....
2. Artificial intelligence help doctors to ....
3. In production line robot help in ....
4. In Scratch program the sprite location an stage is determined by the value of ....
5. The variable Z = 3.5 data type is ....

3 Put (✓) in front of the correct sentence and (x) in front of the wrong one.

1. In Python language text variables values are placed between single quotes ' ' or double " ". ( )
2. General artificial intelligence focuses in work on performing a specific task. ( )
3. Infrared sensors devices is used in remote controls. ( )
4. In Scratch program the symbol (icon) ⚐ is used to execute the project. ( )
5. Robot device pick up sounds using visible sensors. ( )

Test 4

1 Choose the correct answer from a, b, c or d.

1. The interactive Python interface is ....
   a. Booleans   b. Editor   c. Python Shell   d. string
2. In Scratch program from sprites area you can ....
   a. add sprite   b. change sprite name
   c. delete sprite   d. all of them
3. From Scratch program features all the following except ....
   a. allow learning the complex code   b. a learning program
   c. simple interface   d. free program
4. The most advanced artificial intelligence is ....
   a. narrow   b. super   c. general   d. none of them
5. The inferared sensors devices are used in ....
   a. remote controls   b. non-contact thermometers
   c. both (a and b)   d. none of them

2 Complete the following sentences with the appropriate words in brackets.

(Download the program – print ( ) – Choose a sprite – NumPy – software)

1. In Python the function which is used to display text and variables is ....
2. .... is what make a robot smart and determine how robot respond to information it receive.
3. To create a project using Scratch program you have first to ....
4. Click on .... to create a new sprite in Scratch program.
5. .... is Python library which is used in statistics.

3 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. The data type for the variable (school) in school = "Salam" is text. ( )
2. Python language cannot be integrated with any programming language. ( )
3. You can delete a sprite of stage from sprite area. ( )
4. Scratch program is considered a difficult program to learn. ( )
5. The artificial intelligence is just only one type. ( )

Test 5

1 Choose the correct answer from a, b, c or d.

1. .... offer you suggestions for products that you might like.
   a. Instant translator b. Machine learning
   c. Smart shopping d. Smart games
2. Robotics technology is facing challenges like ....
   a. safety b. employment c. ethics d. all of them
3. An area in Scratch program is called .... where the project appears in.
   a. Blocks b. Script c. Stage d. Sprites
4. Python language is an .... language that it translate programming code line by line.
   a. interpreted b. easy - to use c. integrated d. open source
5. In Python language the text value is placed between .... signs.
   a. " " double b. ' ' single c. both (a and b) d. none of them

2 Complete the following sentences with the appropriate words in brackets.

(Pandas – Vision – Open source – type ( ) – start)

1. To know the type of the variable .... function is used in Python language.
2. In Python language .... library is used to analyze and process data.
3. .... is an icon used to view the executing of the project in Scratch program.
4. Robot devices use .... sensors to take (pick up) images, videos.
5. From Python language features that it is .... language.

3 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. You can change the sprite movement direction by move command. ( )
2. Scratch program doesn't enhance collaboration skills or creative thinking. ( )
3. The controller is the brain of the robot, processing the data collected by sensors and issuing command to motors. ( )
4. The first step of the sensor device work is displaying the results. ( )
5. The artificial intelligence needs a huge amount of information. ( )

Test 6

1 Choose the correct answer from a, b, c or d.

1. .... is from artificial intelligence applications in our daily life.
   a. Personal assistant   b. Smart shopping
   c. Smart cars   d. All of them
2. In robot device .... is considered the senses of a robot just as eyes and ears.
   a. structure   b. motors   c. sensors   d. controller
3. The Block "Go to Random Position" in Scratch program is used to................ .
   a. move sprite to specific position   b. move the sprite in a random motion
   c. hide sprite   d. delete sprite
4. .... is an understandable language and it use words similar to english.
   a. Python   b. Java   c. C#   d. C++
5. .... is a function that is used to display text, values on screen.
   a. Type ( )   b. Print ( )   c. Editor   d. Python shell

2 Complete the following sentences with the appropriate words in brackets.

(sensing – Python Shell – machine language translator – Surgical robot – Stage)

1. The interactive Python interface is ....
2. .... is an area in Scratch program used to display project.
3. The sensor device first work step is ....
4. The natural language processing is like .... as it understand human language.
5. .... is a robot use sensors devices and help to perform surgeries.

3 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. Robots and Machine learning are from Artificial intelligence field. ( )
2. Distance sensors are used to avoid surrounding obstacles and collisions. ( )
3. Python language is considered from the most difficult programming language. ( )
4. Robots doesn't need software in its work. ( )
5. The main job of sensors devices is picking up the environment changes and convert it to signals. ( )

Test 7

1 Choose the correct answer from a, b, c or d.

1. The motors in robot devices like ....
   a. electric   b. pneumatic   c. water (hydrous)   d. both (a & b)
2. Challenges that facing robotics technology are................ .
   a. increase independence on paper documents
   b. safety, employment, ethics
   c. increase independence on smartphone
   d. none of them

3. The text variable value are placed between .... sign.
   a. ‘ ’ single or “ ” double quotes b. < >
   c. > = d. = <

4. Robots devices help in dangerous tasks like ....
   a. means of transportation b. hazardous chemicals
   c. watering gardens d. house cleaning

5. The last step of sensor device work is ....
   a. transmission b. display results c. sensing d. conversion

2 Complete the following sentences with the appropriate words in brackets.

(print ( ) – structure – motors – Infrared Sensors – Sprites)

1. .... is considered the robot device muscles.
2. In Scratch program .... area is used to add and delete sprite.
3. In Python language .... function is used to display text and values on screen.
4. The main part of the robot which carry all its components is ....
5. .... is used to measure temperature without direct contact.

3 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. Artificial intelligence doesn't need large amount of information. (   )
2. Robots are used in factories only. (   )
3. X axis and Y axis are used to identify the current sprite location on stage. (   )
4. Z = 10 The data type of the variable Z is integer number. (   )
5. In Scratch program we can not add more than one sprite on Scratch stage. (   )

Test 8

1 Choose the correct answer from a, b, c or d.

1. In Python language variable data type which is used to store names and addresses is ....
   a. number b. booleans c. string d. nothing

2. In Scratch program the area which is used to add sprite is ....
   a. stage b. sprites c. blocks d. script

3. There are many types of robots like ....
   a. industrial b. home c. medical d. all of them

4. The first step of the sensor device is ....
   a. sensing b. converting c. display results d. nothing

5. There are many applications of the artificial intelligence in our daily life like ....
   a. personal assistant b. smart cars c. smart shopping d. all of them

2 Complete the following sentences with the appropriate words in brackets.

(Choose a sprite – add or delete sprite – integer (int) – Super AI – picking up information)

1. In Python language X = 5 The variable X data type is ....
2. In Scratch program to add a new sprite click on .... from sprite area.
3. In Scratch program from sprite area you can ....
4. The main job of the sensor device is ....
5. The most advanced artificial intelligence is ....

3 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

1. The general artificial intelligence focus on performing a specific task. ( )
2. Infrared sensors devices are usually used in remote controls devices. ( )
3. Challenges which face robotics technology are safety, employment and ethics. ( )
4. Scratch program is considered a difficult learning tool for many students. ( )
5. You can integrate Python language with another language like C # , C + + , Java. ( )

Test 9

1 Choose the correct answer from a, b, c or d.

1. .... is from artificial intelligence applications in our daily life.
   a. Personal assistant b. Smart games c. Smart cars d. All of them
2. Features of Python language are ....
   a. open source b. interpreted language
   c. easy - to - use d. all of them
3. In Scratch Program you can change sprite size from its value in .... area.
   a. sprites b. script c. stage d. blocks
4. Using robots in production lines leads to ....
   a. decrease efficiency and productivity b. doesn't improve production
   c. increase efficiency and productivity d. slow production
5. Sensors devices help robots to ....
   a. learning new languages b. interacting with its environment
   c. slow its operations d. none of them

2 Complete the following sentences with the appropriate words in brackets.

(Develop web applications – software – print ( ) – Motors – Save to your computer)

1. The responsible robot part of moving its components is ....
2. .... is what make a robot smart and determine how it responds.
3. In Scratch program to save your project which you create it from file menu select ....
4. You can use Python language in ....
5. .... is a function used to display text and values on screen in Python language.

3 Put (✓) in front of the correct sentence and (x) in front of the wrong one.

1. Natural language processing is like intelligent language translator. ( )
2. It is not allowed that variable name begins with underscore - sign. ( )
3. (X , Y) axis are used to determine the sprite location on stage. ( )
4. To execute your project in Scratch program click on icon. ( )
5. The main job of the sensor devices is producing sound. ( )

Test 10

1 Choose the correct answer from a, b, c or d.

1. .... is from artificial intelligence applications in our daily life.
   a. Smart games
   b. Digital Doctors
   c. Instant translator
   d. All the them
2. .... Sensor devices are used to pick up images and videos.
   a. Sound
   b. Touch
   c. Light
   d. Vision
3. Scratch program helps student in ....
   a. learning principles of programming
   b. develop collaboration skills
   c. both (a , b)
   d. none of them
4. Which of the following variables is a text type ....
   a. City = "Cairo"
   b. Y = 10
   c. X = 3.5
   d. is - student-success = True
5. Python language can be integrated with other language like ....
   a. C #
   b. C + +
   c. Java
   d. all of them

2 Complete the following sentences with the appropriate words in brackets.

(Motors – open source – Narrow & Super – print ( ) – Surgical robot)

1. In Python language .... function is used to display text, results on screen.
2. Features of Python language are ....
3. .... is considered as robot muscles.
4. Artificial intelligence type are ....
5. .... is a device which uses sensor devices to perform surgeries operations.

3 Put (✓) in front of the correct sentence and (x) in front of the wrong one.

1. Sensors devices help robot to learn new languages. ( )
2. Software is the robot component which affect its weight and its ability to move. ( )
3. You can download Scratch program freely from its official website. ( )
4. In Scratch program you can change the sprite movement direction from move command. ( )
5. Python language is used to develop web and artificial intelligence application. ( )



Answers of The Main Book

Lesson 1 Artificial intelligence Applications

El-Moasser Exercises

1 Choose the correct answer from a, b, c or d.

(1) **d.** Narrow AI (2) **b.** Smart games
(3) **c.** Smart cars
(4) **b.** Understanding our commands
(5) **b.** Simulating human learning through neural networks
(6) **b.** Enabling systems to learn from data and improve their performance
(7) **a.** Natural Language Processing

2 Complete the following sentences with the appropriate words in brackets.

(1) General Artificial Intelligence (GAI)
(2) Natural Language Processing (NLP)
(3) Teachable Machine
(4) Computer Vision
(5) Machine learning

3 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

(1) (✓) (2) (✓) (3) (×) can
(4) (✓) (5) (✓)
(6) (×) many tasks (7) (✓)

Student's Book Exercises

- **Put (✓) in front of the correct sentence and (×) in front of the wrong one.**

(1) (×) used in many fields (2) (✓)
(3) (✓) (4) (×) quickly
(5) (✓) (6) (×) large amounts
(7) (×) (narrow - general - super)
(8) (×) specific task (9) (✓)
(10) (×) any task human can do
(11) (×) solve problems that are difficult for humans to solve easily
(12) (✓) (13) (✓) (14) (✓)
(15) (✓) (16) (✓)

Lesson 2 Sensors

1 Choose the correct answer from a, b, c or d.

(1) **b.** devices that sense changes in the environment and convert them into signals.
(2) **c.** enable robots to understand and interact with their environment.
(3) **c.** Electric motor
(4) **d.** Sensing changes in the environment
(5) **c.** determining the distance between the robot and obstacles.

2 Complete the following sentences with the appropriate words between brackets.

(1) Sensor (2) Ultrasonic sensor
(3) Signal conversion (4) Sensors
(5) Distance sensor

3 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

(1) (×) Distance Sensors
(2) (✓) (3) (✓)
(4) (×) emits high-frequency sound waves
(5) (✓)

Student's Book Exercises

* **Choose the correct answer from a, b, c or d.**

(1) **b.** Capture environmental changes and convert them into signals
(2) **b.** Allow them to interact with their environment
(3) **c.** Distance sensors (4) **c.** Sensing

(5) b. Infrared sensors (6) d. Laser beams
(7) b. Remote controls
(8) b. In places with variable lighting conditions
(9) a. Ultrasonic sensors
(10) c. Smart Home Lighting System
(11) b. Infrared sensor
(12) c. Convert the information into electrical signals
(13) d. Distance sensors
(14) c. Track the movements of players
(15) c. Environment and required accuracy

Accumulative Test on Lessons 1 & 2

1 Choose the correct answer from a, b, c or d.

(1) c. Both (a) & (b)
(2) c. Environment and accuracy required
(3) d. All of them
(4) b. Capture environmental changes and convert them into signals
(5) b. Simulation of human learning via neural networks

2 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

(1) (✓) (2) (✓) (3) (×) can
(4) (×) can (5) (×) do rely (6) (✓)

Lesson 3 Robots

El-Moasser Exercises

1 Choose the correct answer from a, b, c or d.

(1) b. Software (2) c. Both a & b
(3) d. All of them (4) c. education
(5) d. All of them

2 Complete the following sentences with the appropriate words in brackets.

(1) Robot
(2) Educational robots (3) Motors
(4) Controller

3 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

(1) (×) can be programmed
(2) (×) Educational robots
(3) (✓) (4) (✓) (5) (✓)
(6) (×) software (7) (✓)
(8) (✓)
(9) (×) can perform delicate medical operations
(10) (✓)

Student's Book Exercises

1 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

(1) (✓)
(2) (×) Robotics have many fields
(3) (✓) (4) (✓)
(5) (×) Sound sensors (6) (✓)
(7) (✓)
(8) (×) batteries and solar energy can also be used (9) (×) need
(10) (✓) (11) (✓)

2 Choose the correct answer from a, b, c or d.

(1) c. Safety, employment and ethics
(2) a. Increased efficiency and productivity
(3) b. Handling heavy weights and hazardous chemicals
(4) d. Vision

Lesson 4 Scratch

El-Moasser Exercises

1 Choose the correct answer from a, b, c or d.

(1) b. Teaching the basics of programming in a visual and fun way
(2) c. Free and available for download
(3) b. Organizing code

(4) b. the official website of the program
(5) B. Script Area
(6) c. control the execution time of commands
(7) a. menu bar

2 Complete the following sentences with the appropriate words between brackets.

(1) Script Area
(2) Stage Area
(3) Control block
(4) Sb3
(5) Command Block

3 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

(1) (✓) (2) (✓) (3) (✓)
(4) (×) Sb3 (5) (✓) (6) (✓)
(7) (×) to show the result of the work or project

Student's Book Exercises

- **Put (✓) in front of the correct sentence and (×) in front of the wrong one.**

(1) (✓) (2) (✓)
(3) (×) easy to use
(4) (×) simple codes (5) (✓)
(6) (×) free of charge
(7) (×) Scratch makes it easy to share projects with others
(8) (×) shows the result of the work or project
(9) (×) Stage area (10) (✓)

Accumulative Test on Lessons 3 & 4

1 Choose the correct answer from a, b, c or d.

(1) d. All of them
(2) c. Free download (3) d. Menu bar
(4) b. challenges (5) b. Script Area
(6) b. Software

2 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

(1) (×) can rely on (2) (✓)
(3) (✓) (4) (✓)
(5) (×) Scratch program is free and used to learn programming for beginners
(6) (✓)

Lesson 5 Sprites Area in Scratch

El-Moasser Exercises

1 Choose the correct answer from a, b, c or d.

(1) a. X and Y axises
(2) b. Choose Sprite
(3) d. Go to random position
(4) b. Add Extension
(5) b. Repeating short lines at different angles

2 Complete the following sentences with the appropriate words between brackets.

(1) Sprites area
(2) Go to random position
(3) Pen blocks (4) Repeat
(5) Direction

3 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

(1) (×) (0,0) (2) (✓) (3) (✓)
(4) (×) Choose a Backdrop
(5) (✓) (6) (✓)
(7) (×) used to play the sound.

Student's Book Exercises

* **Put (✓) in front of the correct sentence and (×) in front of the wrong one.**

(1) (✓) (2) (×) any number of times
(3) (×) horizontal X and vertical Y
(4) (✓) (5) (✓) (6) (✓)
(7) (×) Show or Hide (8) (✓)
(9) (✓) (10) (×) more than one object

(11) (✓)
(12) (×) to stop the execution of the project
(13) (×) Choose a Backdrop
(14) (×) to start the project
(15) (✓)

Lesson 6 Principles of Python

El-Moasser Exercises

1 Choose the correct answer from a, b, c or d.

(1) a. easy to use
(2) c. both (a) and (b)
(3) d. libraries
(4) a. Pandas
(5) b. interpreted

2 Complete the following sentences with the appropriate words between brackets.

(1) Versatility
(2) Programming
(3) Charts

3 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

(1) (✓)
(2) (✓)
(3) (✓)
(4) (×) NumPy
(5) (×) Panda

Student's Book Exercises

1 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

(1) (×) allow
(2) (×) It is permissible
(3) (✓)
(4) (✓)
(5) (✓)
(6) (×) It's one of the easiest
(7) (✓)
(8) (×) is the abundance of libraries
(9) (✓)
(10) (✓)

2 Download Python from the official website and arrange the following steps in the correct order.

(1) Visit the official Python website www.python.org
(2) Choose "Downloads".
(3) Choose the system you are working on (Windows, Mac, or Linux).
(4) You must choose 64 bit or 32 bit, depending on your device specifications.
(5) After downloading, install the program on your device and follow the instructions.

Lesson 7 Variables in Python

El-Moasser Exercises

1 Choose the correct answer from a, b, c or d.

(1) a. strings
(2) b. print ( )
(3) b. text editor
(4) a. type ( )

2 Complete the following sentences with the appropriate words between brackets.

(1) Booleans
(2) Interactive python interface
(3) underscore

3 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

(1) (×) reserved place - to store variable values
(2) (×) must start with a letter or underscore
(3) (✓)
(4) (×) mustn't be used
(5) (×) take true or false
(6) (×) letter case must be considered

Student's Book Exercises

1 Put (✓) in front of the correct sentence and (×) in front of the wrong one.

(1) (✓)
(2) (×) must begin
(3) (✓)
(4) (✓)
(5) (×) reserved words mustn't be used
(6) (✓)
(7) (✓)
(8) (✓)
(9) (×) we need
(10) (✓)

2 Choose the correct answer from a, b, c or d.

(1) c. print ( )
(2) a. ""
(3) c. print ( )
(4) b. type ( )

Accumulative Test on Lessons 5,6 & 7

1 Choose the correct answer from a, b, c or d.

(1) a. can be modified
(2) d. all of them
(3) b. print ( )
(4) c. editor
(5) c. both a and b
(6) a. " "

2 Put (✓) in front of the correct sentence and (x) in front of the wrong one.

(1) (×) used in data science and machine learning
(2) (×) have sprites
(3) (✓)
(4) (×)
(5) (✓)
(6) (✓)

February Test

1 Choose the correct answer from a, b, c or d.

(1) b. understand sound command and perform
(2) d. signals
(3) d. all of them
(4) b. educational

2 Put (✓) in front of the correct sentence and (x) in front of the wrong one.

(1) (✓) (2) (✓) (3) (×) (4) (✓)

3 Complete the following sentences with the appropriate words in brackets.

(1) Deep learning
(2) smart games, digital doctors
(3) signal conversion, Transmission
(4) Distance sensors

March Test

1 Put (✓) in front of the correct sentence and (x) in front of the wrong one.

(1) (✓) (2) (×) (3) (✓) (4) (✓)

2 Complete the following sentences with the appropriate words in brackets.

(1) Remote controls
(2) Sound waves
(3) Infrared sensors
(4) microphone

3 Choose the correct answer from a, b, c or d.

(1) a. Touch screen
(2) b. convert signals to another electric signals
(3) d. all of them
(4) b. algorithms

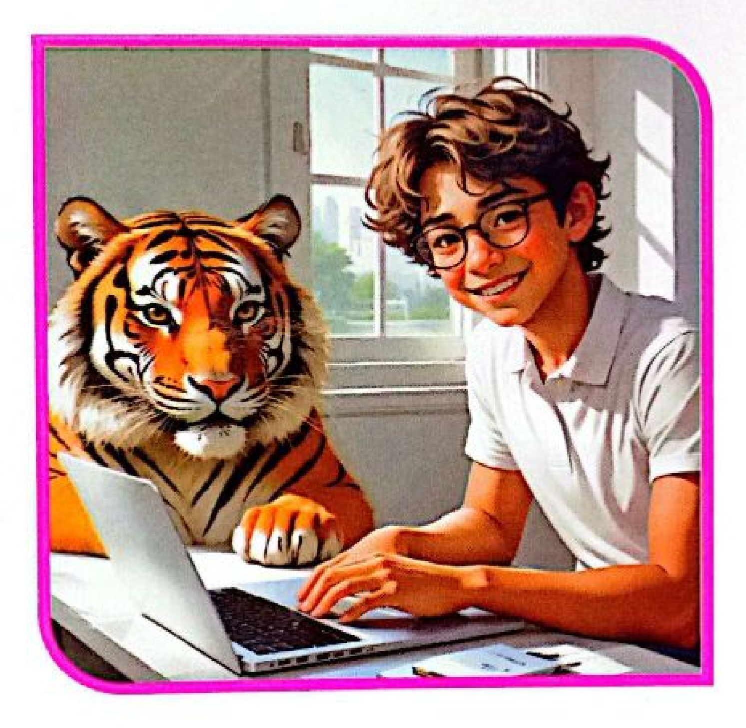
ترخيص وزارة التربية والتعليم ٢٠٣-١٠٠-٢-٨٥



Guide

COMPUTER & INFORMATION AND COMMUNICATION TECHNOLOGY





1ST Prep. 2025
SECOND TERM




AL TALABA BOOKSTORE
For printing, publication & distribution
El Faggala - Cairo - Egypt
Tel.: 02/ 259 340 12 - 259 377 91
e-mail: info@elmoasserbooks.com
15014 www.elmoasserbooks.com





/ElMoasser.eg


SIR. AHMED HAMDY
ICT TEACHER
احجز الأن
مجموعات اونلاين
لشرح منهج التكنولوجيا ict
للمدارس العربي والتجريبي
GRADE
4.5.6 AND 7